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ON TINCTURE AND FERRATED TINCTURE OF BARK.

By JNO. M. MAISCH.

Among the innumerable preparations of Peruvian Bark, one called "Ferrated Tincture of Bark," has attracted a good deal of attention. As originally suggested by Mr. S. Simes, of this city, Huxham's tincture of bark prepared with Calisaya bark, is deprived of cinchotannic acid by means of freshly precipitated sesquioxide of iron, and the filtered tincture, thus altered, is afterwards finished by dissolving in it ammonio-citrate of iron. Mr. A. B. Taylor, who experimented with it at that time, came to the conclusion that but a small quantity of iron was held in solution; but after the publishing of an analysis made by Booth, (*Amer. Journ. Ph.* 1858, 295—402,) the whole subject has apparently been left to rest. Parrish's Practical Pharmacy, page 130, however, states, that citric acid and the citrate dissolved in the tincture produce a bulky precipitate, which from ten fluid ounces contains but 3 grains of iron.

In taking up this subject, I have sought to settle the matter in a different way. My investigations were in the first place directed to the tincture of bark.

It is well known that the various tinctures of cinchona as directed by our Pharmacopœia, produce in a short time a brownish red precipitate, which increases gradually. I believe that this precipitate has generally been taken to be cinchona red, or some similar product of oxidation, which, being of little value, might be rejected. As the tinctures are always demanded in a clear and transparent condition, this precipitate is, of course, thrown aside. If it is separated from the clear liquid by filtration, and washed

with diluted alcohol, until this ceases to take up anything, the residue upon the filter is insoluble in water and possesses scarcely any taste; but when it is now treated with acidulated water, a slightly colored solution is obtained, which, besides some cinchonic red, contains quinia and quinidia. For if this solution is supersaturated with ammonia, and then agitated with ether, the ether on evaporation leaves a residue which is partly gumlike, partly of a crystalline structure, and gives with chlorine water and ammonia the characteristic green color of those two alkaloids.

The result is the same, whether tincture of red or yellow bark, or any compound tincture of either kind, is employed. I have also examined several precipitates from ferrated tincture of bark, and have discovered the alkaloids in every instance. Of some of these last named tinctures I did not learn the process, but among my notes I find that the precipitate which, on standing, had been separated from the ferrated tincture prepared by its originator, Mr. Simes, contained the alkaloids. I have likewise obtained them from the tincture prepared by myself, by sesquioxide of iron and ammonio-tartrate, or citrate of iron, instead of the ammonio-citrate, and from the precipitate occasioned in tincture of bark by an acid solution of citrate of iron. In view of the uniformity of the results obtained by many experiments, I can therefore assert, that *the precipitates separating from the various simple, compound and ferrated tinctures of bark contain a portion of the alkaloids in a state insoluble in water and diluted alcohol.*

The precipitate obtained from a simple tincture of bark, after it has been washed with diluted alcohol, and treated with acidulated water, consists chiefly of cinchonic red; it is insoluble in water, scarcely soluble in ether, freely soluble in strong alcohol and reprecipitated by water; it is dissolved by caustic alkalies with a deep blood-red color, and precipitated by acids, in the form of brownish red floccules; the alkaline solution neutralized as nearly as possible, produces a purplish brown precipitate with acetate of lead and a yellowish brown with sesquichloride of iron. The cinchonic red has the behaviour of a weak acid; and inasmuch as it is formed according to Schwartz, by the oxidation of cinchotannic acid, I propose for it the name of

*rufo-cinchotannic acid*, which is in accordance with the nomenclature adopted for the red bodies obtained by oxidation from the various tannic acids.

Whether the precipitate appearing in simple tincture of bark consists only of this rufo-cinchotannic acid and the alkaloids, I have neglected to ascertain, possibly kinic acid may be likewise found in it. To this my attention was not drawn, until I operated with the precipitates from ferrated tincture of bark; when they were treated with diluted sulphuric or muriatic acid, and the filtrate subsequently over-saturated with ammonia, no precipitate of oxide of iron took place, but sulphocyanide of potassium indicated the presence of a considerable quantity of the sesquioxide; citric and tartaric acids were not present, but as kinic acid likewise prevents the precipitation of iron salts by alkalies, I tested for it, and have obtained satisfactory evidence of its presence, though the quantity I had to operate on was too small to obtain kinone in an isolated state. When the precipitate was heated with diluted sulphuric acid and binoxide of manganese, the peculiar pungent odor of kinone was given off, and I obtained a slight yellow sublimate for a time; boiled with strong sulphuric acid a grass green color was produced.

If these reactions may be regarded as a sufficient proof of kinic acid in the precipitate from ferrated tincture of bark, the probability is, that the precipitate from the simple tinctures also contains it. But if we look to the importance in a medicinal point of view of the constituents of the precipitate, the alkaloids take the first place; next in order the rufo-cinchotannic and kinic acids. Whether kinic acid possesses any medicinal virtues at all, I believe has not been ascertained yet, but the advantage of retaining it in solution would be to represent thus the constituents of the barks in their natural combination. While the tinctures of our Pharmacopœia aim at this end, *the process is entirely unsatisfactory*. If we exhaust powdered Peruvian bark by diluted alcohol in a displacement apparatus until the resulting tincture is free from alkaloids, alcohol, subsequently employed, will take up another portion of alkaloids.

It is asserted, and I believe, correctly, that vegetable material treated by percolation, cannot be absolutely exhausted by any

given menstruum, because of our inability to break up each individual cell. While I recognize this, I believe the cause of the incomplete exhaustion, in the above instance, to lie in a different direction, namely in the natural condition of the alkaloids in the bark, which are there partly combined with kinic, cinchotannic and probably also, at least in some species, with rufo-cinchotannic acid. This fact will point out directly the necessity of employing for our tinctures a stronger alcohol.

Simple tinctures made from red or Calisaya bark with diluted alcohol, often commence to precipitate before the percolation is finished, or at least in the course of a few days. A tincture, however, prepared by percolation with alcohol, of .877 spec. grav. (3 fluid parts alcohol of .835 and 1 p. water,) retains every constituent in solution, though it *may*, perhaps, ultimately produce some precipitate, and the bark, after exhaustion, does not yield any alkaloids to a stronger alcohol. The rational solvent, therefore, for our officinal tinctures is, not diluted alcohol, but a mixture of 1 part of water with 3 parts of alcohol, or perhaps still better, officinal alcohol.

We must keep in mind that by employing a stronger alcoholic menstruum, changes by oxidation are by no means prevented, but on the contrary rather facilitated, as I attempted to prove two years ago, in a paper on the preservation of fluid extracts. To the doctrines laid down in that paper, I still adhere; notwithstanding this, I now recommend a menstruum for the tinctures of bark, stronger in alcohol, for the following reasons:

The principal constituents of bark, the alkaloids, are not likely to be easily affected by the exposure to the air in the presence of alcohol; at least not if heat is avoided as much as possible. I have isolated quinia from tinctures and their precipitates several years old. I have also observed kinic acid in the tincture, and as I have shown above, in old precipitates from ferrated tincture of bark; kinic acid, for this reason does not appear to be prone to change by exposures. Rufo-cinchotannic acid, however, as has been shown by many chemists, increases in quantity with the age of the solution, while the cinchotannic acid gradually disappears; the medicinal effects of this product of decomposition, if we may judge from analogy

with gallotannic acid, are similar to its tannin. Now, if it is correct to choose of two evils the least, we have to select a menstruum which secures to us the whole virtues of the bark, though they may partly be affected by oxidation, in preference to the one which does not exhaust the bark entirely, is no safeguard against oxidation, and necessitates a considerable loss by its inability to preserve a complete solution.

Whether the increase of the strength of alcohol is objectionable from a medicinal point of view, is not for me to determine, but if we must have tinctures of bark, let us at least have such—this I conceive to be the pharmaceutical view of the subject—which preserve, better than others, their properties.

*Philadelphia, April, 1861.*

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ON CANE SUGAR IN ITS RELATIONS TO SIMPLE AND OTHER  
SYRUPS.

BY WILSON H. PILE, JR.

(An Inaugural Essay presented to the Philadelphia College of Pharmacy, 1861.)

Every one who has been accustomed to prepare the various syrups and saccharine fluid extracts demanded in pharmacy, must be aware of the uncertainty, and often perplexity, which attends their manufacture. The difficulty arises in part from a faulty manipulation, in the boiling being too long continued, or from a badly shaped vessel, occasioning too great a loss by evaporation, before even the boiling point be reached. In other cases a want of proper adjustment of the liquid menstrua to the amount of sugar employed, giving a preparation either too thin or dense, or rendering it difficult or impossible to make the exact quantity required by the formula. In the non-medicinal syrups a skilful operator can judge with sufficient accuracy by various familiar signs, when the proper degree of consistency is arrived at; but this could not be done by an inexperienced hand, and with the more important fluid preparations, where sugar is employed a more exact and certain method must be used.

In our national Pharmacopœia, it has unfortunately happened

that in many of the formulæ the difficulties above alluded to are encountered, and the resulting syrup is either disposed to fermentation or to deposit sugar by crystallization. While in other formulæ the quantity of the preparations, when finished, are greater than that intended, and in consequence its medicinal activity proportionally diminished.

The design of the writer of this paper is not to go into any consideration of the changes which sugar may undergo, in the various syrups, by long boiling, or from chemical changes occasioned by contact with substances with which it may be combined; but to offer some remarks of a more practical character.

In pursuit of the following investigations, Lovering's pulverized sugar was employed. In making syrups, however, it is very apt to form a mass at the bottom of the vessel, thereby being liable to be burned, where heat is taken to effect the solution; crushed sugar has not this tendency, and is therefore preferable in most cases. This sugar, as generally met with, is nearly dry, 20 grs. being exposed to a heat of 180° Fah. for two hours, lost .19 grs. or .95 per cent. The specific gravity of it was found, by several trials, to be 1.589. This result was ascertained by finding the weight of the bulk of a quantity of sugar, compared with the weight of an equal bulk of nearly absolute alcohol. This liquid was taken on account of the almost insolubility of sugar in it, and in order to guard against error which the small amount taken up might cause, the alcohol used was allowed to stand with dry sugar before being used.

A sample of the sugar without previous drying was found to have a specific gravity of 1.58 and as this represents the official sugar, I have therefore used it in the succeeding investigations.

By calculation, 1 lb. of sugar will be found to equal 8 fluid oz. Thus, 1 lb. = 5760 grs., dividing this by its specific gravity ( $5760 \div 1.58$ ) its bulk in grains will be 3645.569, which divided by 455.69 grs., the number of grains in a fluid ounce gives 8 fluid oz. I have, however, found that when sugar is dissolved in water it occupies a less space than above stated, showing a slight condensation. This was ascertained by direct experi-

ment and verified by calculation, as follows: By trial, 5760 grs. of sugar, and 3094 grs. of water, gave a syrup having a specific gravity of 1.319; made from these quantities the syrup weighs 8854 grs., and as its specific gravity is 1.319 its bulk is  $\frac{8854}{1.319}$  6712.6grs., subtracting from this the bulk of the water, we have 3618.6 grs., for the bulk of the sugar, or  $\frac{3618.6}{455.09}$  7.941 fluid oz.\* This divided into its weight  $(\frac{5760}{3618.6})$  gives 1.591, which represents the apparent specific gravity of sugar in this solution occasioned by condensation. In solutions, however, of different densities, the condensation varies, being greater in proportion as the quantity of sugar diminishes. A few results are given below, taken from several experiments.

In a solution of 10 per cent. of sugar, the apparent specific gravity, arising from a greater degree of condensation, equals 1.613.

In one of 25 per cent.	1.608 sp. gr.
" 50 "	1.602 " "
" 65 "	1.593 " "

The bulk of 12 ounces of sugar in solution has been shown to equal 7.941 fluid ounces, it may therefore for all practical purposes be considered that  $\frac{1}{2}$  of its weight will equal its bulk in fluid ounces. As the idea generally prevails, that half of its weight equals its bulk, this fact may be of some importance.

As the above mentioned differences in the condensation of sugar were ascertained by experimenting with various percentages, I have collected these together and formed the following table:

*Table of the specific gravity of Sugar in solution, 60° Fah.*

PERCENTAGE OF SUGAR.	SPECIFIC GRAVITY.	PERCENTAGE OF SUGAR.	SPECIFIC GRAVITY.
0	1.000	40	1.1778
5	1.0191	45	1.2043
10	1.0391	50	1.2310
15	1.0600	55	1.2597
20	1.0812	60	1.2889
25	1.1045	65	1.3191
30	1.1281	70	1.3503
35	1.1526		

\*On the preceding page, 1 lb. of sugar is shown to have a bulk of 8 fluid ounces, while here in solution it has only 7.961 fluid ounces.

As the experiments in this essay were chiefly made in reference to pharmacy, the conclusions arrived at are as follows: That in many of the U. S. P. formulæ, the proportion of sugar employed is either too great or insufficient; while in others, the quantity of fluid preparation, when made, does not bear that proportion to the drug or active principle which was evidently intended.

Among the first may be noticed simple syrup, syrup wild cherry bark and syrup ipecac; among the latter, fluid extract senna and fluid extract rhubarb and comp. syrup squills.

Syrup made according to the officinal directions, will crystallize, unless in very warm weather, and will have a specific gravity of 1.327, instead of 1.319. If a syrup that will not deposit crystals, and having a density of about 1.320, should be chosen by the framers of the forthcoming Pharmacopœia, the following formula will meet these requirements:

Dissolve with heat, sugar 36 oz., water 20 fluid ounces; when finished, this should be made to measure 44 fluid ounces, or weigh 55 oz. by the addition of water if necessary.

The following formulæ may prove useful to the apothecary: To make a pint of syrup of 1.320 specific gravity, take 13½ oz. sugar and 7½ fluid ounces of water. 1 lb. avoirdupois requires 8½ fluid ounces water, and should measure 17½ fluid ounces. In all these cases the amount lost by evaporation, is to be made up by the addition of water.

In making syrup of wild cherry bark, we find that the quantity of sugar is too small to insure stability to the preparation, it being only 24 oz. to the pint of solvent. By taking 28 oz. a better syrup is obtained.

In following the officinal directions for making fluid extract of senna, we have a preparation which measures 33 ounces and 5½ drachms. If the fluid extract was intended to represent one ounce of the drug to each fluid ounce, it follows that there is either too much sugar employed, or that the alcoholic tincture is not evaporated sufficiently. To obtain 30 fluid ounces of the extract, retaining the same relative proportion of sugar, evaporate the tincture to 18 fluid ounces and add 18 oz. of sugar.

In fluid extract of rhubarb, the same remarks are applicable; in carrying out this formula, we obtain a product measuring 8

fluid ounces and  $6\frac{1}{2}$  fluid drachms. As this fluid extract is too thick, the sugar might be reduced to  $3\frac{1}{2}$  oz. with advantage, and the preparation would then measure 8 fluid ounces.

*Philadelphia, Feb. 1861.*

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#### ON CHLOROFORMIC SOLUTION OF GUTTA PERCHA.

By WILLIAM HODGSON, JR.

[*Note.*—Soon after it was known that gutta percha would dissolve readily in chloroform, Mr. Hodgson introduced the dark colored impure solution as an application for abraded surfaces, in lieu of court plaster. Subsequently, about eight years ago, he ascertained a method of depriving the solution of color, so as to yield, by evaporation, a colorless layer when applied to the skin. At the request of Dr. George B. Wood, Mr. Hodgson cheerfully communicated his formula for the use of the Pharmacopœia Committee, and with the sanction of those gentlemen we publish the recipe in advance of the Pharmacopœia. The following is a transcript from the report of the College of Physicians of Philadelphia on the U. S. Pharmacopœia.—ED. AMER. JOURN. PHARM.]

#### LIQUOR GUTTÆ PERCHÆ CHLOROFORMICUS.

##### *Chloroformic Solution of Gutta Percha.*

Take of Gutta Percha, in small slices, an ounce and a half.

Chloroform, twelve fluid-ounces.

Carbonate of Lead, in fine powder, two ounces.

To eight fluid-ounces of the chloroform contained in a bottle, add the gutta percha, and shake occasionally till it is dissolved; then add the carbonate of lead, previously mixed smoothly with the remainder of the chloroform, and having shaken the whole thoroughly together, several times, at intervals of half an hour, set the mixture aside and let it stand for ten days, or until the insoluble matter has subsided, and the solution has become limpid, and either colorless or of a slight straw color. Lastly, decant, and keep the solution in a glass stopped bottle.

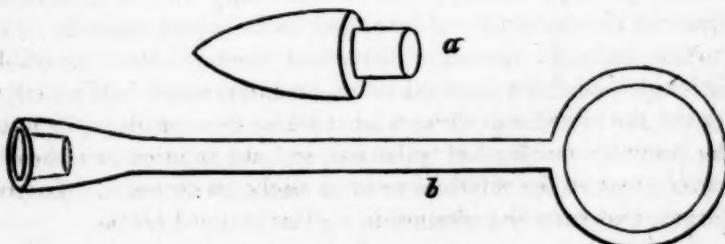
## REPORT ON SUPPOSITORIES.

By ALFRED B. TAYLOR.

(Read at the Pharmaceutical Meeting of the Philada College of Pharmacy, April 2d, 1861)

The demand for suppositories has, within the last year, largely increased, and much attention has been given to the preparation of these appliances. The method of preparing them in paper moulds has been, in a measure, superseded by the more elegant and convenient one of casting them in metallic moulds. They are thereby not only made more regular and handsome in appearance, but at the same time a greater facility is given for thoroughly incorporating the medicinal substances prescribed. I have found that the best mode of making suppositories, is to have the moulds very cold, so that on pouring the melted mixture into them, it becomes immediately solidified, and the suspended powder is thereby prevented from settling, which it is almost certain to do, if paper moulds are used. The moulds may be made cold by placing them on the ice for two or three minutes, previous to using them.

The subject of the best form for suppositories having been referred to me, I have made some experiments in relation thereto. It occurred to me that an improvement might be made on the ordinary form of suppositories, (a simple cone,) by having them so shaped as to fit an instrument for inserting them. Acting upon this idea, I have procured metallic moulds, which are herewith shown, for making them of the shape of the annexed figure, *a*, as also an instrument for inserting them, which I have called a *suppositor*, *b*.



It will be seen that they can be used either with or without this instrument.

Suppositories made in these moulds, of butter of cocoa, weigh twenty-five grains each, and can be medicated in any manner the physician may direct.

I will only add that they have been used by several physicians, who express themselves much pleased with them.

### ON SEVERAL EXTEMPORANEOUS PHARMACEUTICAL PREPARATIONS.

By WILLIAM H. H. GITHENS.

(An Inaugural Essay presented to the Philadelphia College of Pharmacy.)

#### INTRODUCTION.

Having observed a great want of stability in the mixtures of extract of cannabis indica, resin of guaiacum and balsam of tolu, as called for by the usual extemporaneous prescriptions of physicians, it occurred to me that much more elegant preparations might be introduced to take the place of some of those now in use. And also, having experienced difficulty in compounding certain substances, so as to produce a mass with satisfactory pilular consistence, I instituted a series of experiments upon these subjects, some of which were quite successful.

#### ON THE BEST METHOD OF SUSPENDING EXTRACT OF CANNABIS INDICA IN AQUEOUS MIXTURES.

*Experiment 1st.*—One grain of extract of Indian hemp was softened by trituration with a few drops of ether, and then mixed with two fluid-drachms of glycerine. This mixture was agitated until entirely deprived of ethereal odor. It formed a transparent solution of the extract; but upon the addition of an equal bulk of water, the extract was entirely precipitated.

*Exp. 2d.*—Two grains of extract of cannabis were triturated with one fluid-drachm of olive oil, forming, without difficulty, a transparent solution. This was mixed with two and a half fluid-drachms of mucilage of gum arabic, and then with sufficient water to make the mixture measure one fluid-ounce. This preparation is entirely permanent.

*Exp. 3d.*—Thirty grains of Indian hemp were dissolved, a before, in one fluid-drachm of olive oil, also forming a transparent solution. With two drachms of gum arabic and a sufficien

quantity of water to make the mixture measure one fluid-ounce, a perfect emulsion was obtained without difficulty.

*Remarks.*—The extract, if of a good quality, is perfectly soluble in all proportions in olive oil. The second and third experiments are both introduced, to show that the formula will answer for both dilute and concentrated mixtures. These emulsions, after standing undisturbed for six months, had separated into two layers; the upper one being apparently composed of the extract, oil and gum in combination. The lower one was almost perfectly colorless. A slight agitation, however, sufficed to mix them perfectly, as when first combined. No perceptible alteration had taken place, either in taste or odor, during the lapse of time above mentioned.

In view of the increased use of cannabis indica, would it not be well to introduce to the notice of physicians a syrup of that article, containing from one to four grains to the fluid-ounce? It could be very easily prepared by forming an emulsion, as before directed, and adding a sufficient quantity of simple syrup to make up the required measure; flavoring to suit the taste.

While experimenting with the extract of cannabis indica, I discovered that one of the specimens which came under my observation, although a well authenticated article of Squire's manufacture, was not entirely soluble in strong alcohol; twenty per cent. of it consisting of a reddish-brown substance, soluble in water. This was not found in any other specimen.

#### ON THE BEST METHOD OF SUSPENDING RESIN OF GUAIACUM IN AQUEOUS MIXTURES.

*Exp. 1st.*—Thirty grains of gum guaiacum were softened in one fluid-drachm of olive oil, by means of trituration, in a slightly heated mortar; by continuing the trituration for some time, a pasty solution was obtained. This was made into an emulsion without any difficulty, with two drachms of gum arabic and a sufficient quantity of water to increase the measure to one fluid-ounce.

This recipe did not perfectly stand the test of time; at the end of six months the emulsion had separated, one portion having risen to the top; this was readily mixed with the liquid portion by agitation, and formed a very dense emulsion: another portion, of a brown color, had settled to the bottom; it seemed

to consist of impurities and particles of the resin which had escaped solution in the oil.

*Exp. 2d.*—One drachm of resin of guaiac was triturated with half a drachm of carbonate of soda and a few drops of water, until of a uniform pasty consistence; it was then made into an emulsion, with one drachm each of sugar and gum arabic and a sufficient quantity of water to measure one fluid-ounce. A slight deposit only occurred with this mixture. The effect of the soda on the taste was to give a flavor strongly resembling that of cloves.

#### ON THE BEST METHOD OF SUSPENDING BALSAM OF TOLU IN AQUEOUS MIXTURES.

*Exp. 1st.*—One scruple of tolu was dissolved in ether, and triturated with one scruple of sugar and two of gum arabic, until all the ether was dissipated, and a dry powder remained; this was mixed with half a fluid-ounce of water gradually added, and formed at the time a very handsome emulsion; but the particles of the balsam slowly agglutinated, and finally formed a mass at the bottom of the vessel.

*Exp. 2d.*—One scruple of balsam of tolu was dissolved in ether, and mixed with the white of an egg, triturated until all the ether was dissipated, and then mixed with a small quantity of water. The tolu subsequently precipitated.

*Exp. 3d.*—One drachm of very hard, pulverizable tolu was partially dissolved in olive oil, in a heated mortar; this was readily made into an emulsion with two drachms of gum arabic and a sufficient quantity of water to make the whole measure one fluid ounce.

A deposit which fell seemed to consist almost entirely of impurities, the emulsion continuing very dense and possessing the taste of the balsam in a very marked degree.

*Exp. 4th.*—An attempt to form a more perfect solution of the tolu in olive oil, by dissolving the balsam in ether, mixing with the oil, and then triturating until all the ether was dissipated, was not successful, the tolu concreting into a mass when deprived of ether.

*Exp. 5th.*—One drachm of balsam of tolu was triturated with half a drachm of carbonate of soda and a few drops of water, until of a smooth consistence; it was then made into an emul-

sion with one drachm each of sugar and gum arabic, and a sufficient quantity of water to measure one fluid-ounce. A slight deposit occurred.

*Pills of Iron by Hydrogen, &c.*—Pills of perfectly insoluble substances, such as iron by hydrogen, can be very readily made into a tough mass, of a perfectly satisfactory consistence, by the use of a small portion, five grains to the drachm, of powdered tragacanth, with honey. No water must be used, or the mass will become brittle. The only objection offered to this plan, is, that the pills become very hard; but I have found that, even after having been made several months, they are perfectly softened by maceration in water for half an hour. This process will answer very well for pills of sulphate of quinine, as it makes them small and compact, and not liable to flatten.

*Pills of Camphor.*—There is frequently great difficulty experienced in compounding recipes containing camphor, to produce a mass of good pilular consistence; this difficulty may be obviated by the use of soap and honey as excipients, unless they are contraindicated by the accompanying constituents of the prescription.

*Sugar coating pills for prescriptions.*—Pills may be very conveniently coated with sugar for extemporaneous prescriptions, by first moistening the pills with a strong solution of balsam of tolu in ether or chloroform, throwing them immediately into a box containing sugar in a very fine powder, and shaking the box for a few minutes. The application may be repeated if the first coating is not as thick as would be desirable. This process is expeditious and satisfactory, after a few attempts, and offers no resistance to the solution of the pill in the juices of the stomach. If the pills are soluble in the ether, a thick mucilage of tragacanth or gum arabic may be substituted.

*Results of an examination of a deposit found in Anise water.*—A precipitate observed in anise water consisted of a crystalline scaly substance, with an insoluble flocculent matter.

I first treated this precipitate with very dilute nitric acid, which dissolved out the crystalline substance; bicarbonate of potassa added to this solution caused a precipitation. Chlorohydric acid had the same effect as nitric. The flocculent matter was insoluble in all the solvents tried.

Under the microscope the crystals appear to be of different forms, some being prisms, others pyramids, and some in the shape of a cross. They all reflect the light very brightly, appearing like stars, although viewed by diffused light.

I have also observed a precipitate, having the same characters, in fennel water, and as the solid constituents, or steareoptenes, of these oils are identical in composition, I have arrived at the conclusion that the crystalline substance consists of an acid in combination with magnesia, which acid is probably formed by the oxidation of the steareoptene, in consequence of its minute division in contact with the water and magnesia.

#### NOTE ON THE SUPPOSED CHEMICAL COMPOUND OF TANNIC ACID, ETHER AND WATER.

By EDWARD PARRISH.

In justice to my colleague, J. M. Maisch, I desire to call attention to an observation of his, made previously to the recent paper of Professor Bolley, noticed in the current number of this Journal, taken from Annalen der Chem. und Pharm., July, 1860. In the second edition of my "Introduction to Practical Pharmacy," published at the close of the year 1858, the following remark from his pen occurs under the head of Tannic Acid:

"The concentrated ethereal solution contains 46.5 to 56.2 per cent. of tannic acid (Mohr), and is insoluble in ether. Could this be a chemical compound between oxide of ethyle and tannic acid? Thirteen equivalents of the former = 481, to one equivalent of the latter = 618, require exactly 56.2 per cent. of tannin and 43.8 per cent. of ether."

The experiments of Bolley seem to add an additional argument for this view of the composition of the very peculiar etherole of tannin, and render its numerical relations, as above expressed, still more interesting. Until the subject is further investigated, however, the supposed "Tannate of Ether and Water" must be held in abeyance; a demonstration of its existence and composition being placed among our *chemical desiderata*.

## OLEUM GOSSYPII—(COTTON-SEED OIL.)

BY WILLIAM HENRY WEATHERLY, OF FREEHOLD, N. J.

(An Inaugural Essay presented to the Philadelphia College of Pharmacy, 1861.)

“The oil of the seeds of *Gossypium herbaceum*, and other species of the genus.

*Sex. Syst.* *Monadelphus Polyandria.* *Nat. Ord.*—*Malvaceæ.*”

“This is a biennial or triennial plant, and a native of Asia;” it is extensively cultivated throughout the Southern and Southwestern States, where it grows luxuriantly, frequently attaining a height of eight or ten feet, though it averages but five. With us it is an annual plant; the flowers, which are of a variety of colors, first appear in the month of June; the plant continuing to blossom, until the growth of it is checked by frost. The root consists of a main spindle, ten to twenty inches in length, from which numerous rootlets branch off. The leaves are described as being “five-lobed, one glandular beneath; lobes round, mucronate, involucre serrate; stem smooth.” At present the plant is cultivated, almost exclusively, for the fibre, which is found firmly attached to the seeds, but little use being made of any other portion. The picking season commences about the middle of August, lasting frequently as late as January; the fibre is stript from the seeds by the process of ginning, and is packed in bales, by aid of a screw press, when it is ready for shipment. This fibre or “lint” is the only portion of the plant officinal in our *materia medica*. It is used as an application for recent burns and scalds, also in the preparation of collodion.

The root has been spoken of by several writers as possessing emmenagogue properties. It was also reported as being much in use among the slaves, for the purpose of producing abortion; this I believe to be wholly untrue. During a clerkship of eighteen months, in one of the finest cotton-growing regions of the South, I made it a point to inquire into the truthfulness of this report. Not one of some twenty physicians, whom I asked, knew of a single instance where it had been used for or produced this effect. I also inquired of a number of overseers on large plantations, whether they knew of an instance where the

root had been used to produce abortion, but the information I acquired would in nowise substantiate this report.

That the root does possess emmenagogue properties, I do not presume to deny, but its efficacy as an "abortifacient," I certainly disbelieve.

The seeds as taken from the gin are of a grayish-brown color, owing to the short down which still adheres to them; rub this off, and they are of a dark brown, almost black, color. Though long known to contain a large amount of fixed oil, yet until within a few years but little has been manufactured from them. On the plantation, they are used chiefly as fodder for cows in the winter. The oil is obtained by expression, the process and apparatus being similar to that for obtaining linseed oil; the seeds are first deprived of their shells. Four qualities of this oil are found in our market, viz.: crude, clarified, refined and winter bleached. The crude constitutes the oil just as it runs from the mill; it is thick, has a muddy appearance, and deposits upon standing a portion of its impurities. The clarified is comparatively pure, of a deep orange color, and quite limpid. The refined is a very pure oil, not quite so dark colored as the clarified, and very limpid. The winter bleached is of a pale straw color, has rather an earthy, though not very strong odor, and a sweet, bland, nut-oil taste, not dissimilar to that of sweet almond oil. The process of refining the crude oil is at present a secret among the manufacturers, so I am unable to give any account of it. The shelled seed yield about two gallons of crude oil to the bushel, and forty-five per cent. of oil cake. At Mobile, the seed as it comes from the gin, can be bought for twenty-five or thirty cents a bushel; here at the mill, shelled, it is worth one dollar. The crude oil sells for fifty, the clarified sixty, the refined seventy, and the winter bleached eighty cents a gallon.

Cotton-seed oil is largely consumed in the manufacture of woollen goods, and is said to answer equally as well as any oil now in use. It is also adapted to the use of morocco dressers, by whom I am informed it is extensively employed. I learn also from good authority, that it makes a very fine soap, and is used by the fancy soap manufacturers, for that purpose. Although said to be a drying oil, my experience goes to prove

it is a very poor one. Last summer, we retailed a large quantity of it to the planters, for the purpose of oiling their gins, and they found it to answer admirably. We also used it in place of lard oil for lighting the store, and found it to give equally as clear and brilliant a light. The low price at which this oil can be procured, and a knowledge of the immense amount of seed (now put to so little purpose,) which might be bought up and manufactured into oil, are the inducements which led me to choose it as a subject for my thesis. The following experiments were conducted, with a view of ascertaining how far it is capable of substitution for the more expensive oils in our pharmaceutical preparations. The first made with it was unguentum aquæ rosæ, substituting it for oil of almonds; it made a perfectly smooth, white ointment, no way inferior to the officinal, and keeping equally as well. The second was ceratum plumbi subacetatis, substituting it for olive oil; the result was quite as satisfactory as the first. It made a much whiter cerate than the officinal, which generally has a greenish cast. I kept a specimen of this on hand several months without its undergoing any perceptible change. The third was unguentum hydrargyri nitratis, substituting it for neatsfoot oil; the result was a perfectly smooth, uniform ointment, of a rich orange color and of proper consistence. In making the ointment it was found necessary not to heat the oil and lard too hot, else, upon adding the nitrate of mercury, a deposit of a soft resinous consistence will be thrown down, evidently containing a portion of the mercury. Then, again, if the oil be too cold, no effervescence will occur upon adding the nitrate of mercury, and it will be found to remain too soft, almost liquid. I think citrine ointment, carefully made from this oil, will be found to keep its original color and consistence a great length of time. The fourth preparation made with it was emplastrum plumbi; for this some very pure litharge was procured, and the operation conducted with a great amount of care, but (though the result was a perfectly uniform plaster, in which every particle of the litharge was combined,) it would not acquire the proper consistence.

It was also substituted for olive oil in ceratum cetacei, linimentum ammoniæ, and l. camphoræ, making in each instance a preparation quite equal to the officinal. I learn from a reliable

source that olive oil is largely adulterated with cotton-seed oil. A friend of mine, largely engaged in the manufacture of plasters, purchased several casks of olive oil, which he found to be entirely unfit for his purpose, and upon examining it, was satisfied that about two-thirds of it consisted of cotton-seed oil. The specimen of oil, with which the preceding experiments were performed, is the winter bleached. Its specific gravity is .921; it is insoluble in alcohol, soluble in chloroform in all proportions, and in not less than its own bulk of ether. Sulphuric acid turns it of a deep red color, almost a brown. Nitric and hydrochloric acids have no effect upon it, either hot or cold. If the oil be heated much above its boiling point, it will take fire, and burn with a dull reddish flame, giving off but little smoke; and if the heat is removed, the color of the flame will gradually change to a pale blue, similar to that of burning alcohol, and finally die out, leaving part of the oil unconsumed.

Though my facilities for experimenting, and the number of experiments performed, were necessarily limited, yet I think they are sufficient to prove that this oil would make a valuable addition to our officinal list. Here we have a domestic oil, which can be purchased pure, (there being no inducement to adulterate it,) at about one-half the price of olive oil; and I see no reason why we should not make use of it, in every instance where it is capable of being substituted for that oil, instead of paying an exorbitant price for what we do not get; as all will admit, two-thirds of our olive oil is adulterated.

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#### SYRUPUS ASSAFETIDÆ.

By Jos. A. HEINTZELMAN.

As syrup of assafetida is frequently prescribed by physicians, I had occasion to contrive a better plan for making it, than by rubbing the assafetida simply with hot water, and adding sufficient quantity of sugar to the strained saturated water. Such a process results in a turbid syrup, and after standing four weeks or longer, the resin, which partly has been held suspended, separates and collects on the sides of the bottle, and if shaken up disturbs altogether the elegancy of a syrup.

The method which I use, to make the syrup in question, is

more satisfactory, producing a syrup equally strong, less penetrating in its odor and not changing or adhering to the bottle in which it is kept.

**B** Assafœtidæ, 3iv.

Magnesia carb., 3vj.

Sacchari alb., 3xv.

Aquaæ ferventes, fl. 3x.

Triturate the gum resin intimately with the carbonate of magnesia, then add 10 fluidounces of hot water in small portions, constantly agitating the mixture. Filter, and if the impregnated water should measure less than 8 fluidounces, add enough distilled water. Finally add 15 ounces white sugar, put on a water bath and dissolve at a moderate heat. Stir, and as soon as the sugar is dissolved, take the syrup from the fire, any further heating being injurious to the preparation.

A syrup so prepared is clear and transparent, and of a light straw color; its taste and odor is very distinct of the drug itself, and less unpleasant than the *mistura assafœtidæ*, or even the syrup prepared in former way.

*Philadelphia, April 19, 1861.*

#### GLEANINGS FROM THE FRENCH JOURNALS.

By THE EDITOR.

*Biniodide of Potassium.*—Mr. Ernest Baudrimont (*Jour. de Pharm.*, Jan. 1861,) doubts the existence of this salt, and says that iodide of potassium, with an equivalent of iodine in solution, when agitated with sulphuret of carbon, is decolorized, leaving an aqueous solution of iodide of potassium, whilst the sulphuret of carbon is colored by the iodine which it holds in solution.

*Nitrification.*—Millon has observed that *nitre* is always produced with regularity, provided a humus product, an ammoniacal salt, and a mixture of earthy carbonates, are present, the solid mass being constantly moistened and exposed to the air. The action of the alkaline humate is to absorb oxygen, and this oxidation is transferred to the ammonia, which hereby becomes converted into nitric acid.

*Coal Tar Soap.*—M. Demeaux recommends this soap as a disinfectant. It is made by mixing equal parts of coal-tar, soap, and

rectified spirit, and heating on a water bath to complete solution. On cooling, a soap is obtained which is perfectly soluble in warm or cold water. The Academy of Sciences of Paris have appointed a committee to report on the above.

*On the Saccharine substances of Acid Fruits.*—M. H. Buignet (Jour. de Chim. Med., Feb. 1861, from Compt. Rend.) has arrived at the following conclusions in regard to this subject:

1. The original sugar of acid fruits is cane sugar  $C_{12}H_{11}O_{11}$ .
2. During the ripening, this sugar gradually becomes charged with a sugar identical with that obtained by the action of acids on cane sugar  $C_{12}H_{12}O_{12}$ .
3. At the period of maturity, the constitution of the saccharine matter varies with the fruit.
4. The cause of this variation is due, neither to natural acids nor to tannin contained in the fruits, but to a ferment analogous to that of beer.
5. There exists an affinity between this altered sugar and cane sugar which renders their separation very difficult.
6. The process which operates best is that of M. Péligot; it consists in forming a saccharate of lime, that is separated by ebullition and decomposed afterwards by a current of carbonic acid. It is in this manner that crystallizable sugar has been obtained from the peach, the apricot, the plum, the apple, etc.
7. Starch, the presumed source of this sugar, cannot be detected by iodine water or the microscope.
8. It seems represented by a particular principle which resembles tannin; it is perfectly isolable, and its proportion diminishes in measure as that of the sugar augments.
9. Green bananas always contain a great deal of starch and tannin. They disappear with maturity and are replaced by cane sugar.
10. There is, therefore, an essential difference between the processes of art and those of nature, in reference to the transformation of either starch or tannin into sugar; between the sugar of fruits created by natural maturization, and that which is the result of artificial ripening. The first is cane sugar, the latter altered sugar, (sucré interverti.)

*On Sulphurous Powder.* BY MARCELLIN POUILLET.—The formula of the Codex for the preparation of artificial sulphurous waters for drinking, is really inefficient and badly studied. The Academy of Medicine, on the report of M. Robinet, has adopted the following formula, due to the researches of M. Marcellin Pouillet, which attains the triple object of a good preparation, keeping perfectly well and economical.

Sulphuret of Calcium,	Sulphate of Potassa,
Bi carbonate of Soda,	Gum Arabic,
Sulphate of Soda,	Acid Tartaric,

Equal parts of these substances, well dried, are reduced to powder and mixed.

Fifty centigrammes ( $7\frac{1}{4}$  grs.) dissolved cold in a litre ( $2\frac{1}{2}$  th pints) of water, gives, after standing a quarter of an hour, a sulphurous water, which it is impossible to distinguish from the natural sulphurous waters.

The reaction which occurs between the different elements of this powder is easily understood. Tartaric acid and bi-carbonate of soda produce carbonic acid ; and this acid, in the presence of sulphuret of calcium, gives rise to a disengagement of sulphurated hydrogen gas, which is dissolved by the liquid. As all the sulphuret of calcium is decomposed, it results that the water is always identical when that compound is pure, and this is a condition essential to a good preparation.

The trials made by MM. Bazin, Cazenave, and Richet have given the most satisfactory results, and M. Bouchardat himself has prescribed with advantage this sulphurous powder.—*Répertoire de Pharm.* Feb. 1861.

*On Bichloride of Tin as a Solvent.* BY W. GERARDIN.—The solvent properties of bichloride of tin present many analogies with those of bisulphuret of carbon. It dissolves very nearly the same bodies, but in less proportions. At its boiling temperature it dissolves considerable quantities of octohedral sulphur, iodine and ordinary phosphorus. By cooling, the sulphur and iodine are deposited in beautiful crystals. The phosphorus separates in a liquid state, and solidifies without crystallizing. It dissolves amorphous sulphur after prolonged ebullition ; the crystals which form by cooling, are octohedral ; red phosphorus is

completely insoluble. It dissolves bromine and sulphuret of carbon in all proportions. It does not dissolve silicium, tellurium, arsenic, antimony, bismuth, tin, nor their oxides or chlorides.

## GLEANINGS FROM GERMAN JOURNALS.

BY JNO. M. MAISCH.

*Mannite in the leaves of Ligustrum vulgare*, Linn., was found and analyzed by A. Kromayer, who exhausted the leaves gathered in July by hot water, decanted, evaporated to one-half, precipitated by acetate of lead, removed from the filtrate the excess of lead by sulphuretted hydrogen, and obtained mannite from the liquid by crystallization. Polex showed the presence of mannite in privet in 1838.—(Arch. d. Pharm. cli. 281—284.)

*Copper in snuff* was detected by A. Hirschberg. He found in 1 zollpound, ( $\frac{1}{4}$  kilogram.) .897, and in another sort 6.283 grs. copper, determined as oxide from the ashes.—(Arch. d. Ph. cli. 284, 285.)

*An improvement of Liebig's condenser* is proposed by Feldhaus, who suggests to bend a glass tube 8 feet in length, commencing about 18 inches from its upper end, in zig-zag form nearly at right angles, the whole being in the same plane, the length of each bend about five inches, and the first and last of half this length, so as to bring both ends in a straight line. The outer tube is made of tinned sheet iron; oval instead of round; the lower part receives the glass tube with its bends horizontal, and the ends fixed by means of corks; afterwards the upper portion is soldered on. The condensing surface is thus doubled.—(Arch. d. Ph. cli. 285, 286.)

*Unripe figs* contain a caustic juice which destroys the skin and produces violent inflammation of the eye. By boiling, a caoutchouc-like elastic mass is separated, which, when spread on paper or linen, reddens the skin, and produces pustules and erysipelas; spontaneous fermentation likewise separates it; the filtrate is then almost tasteless. This principle is soluble in alcohol, ether and fixed oils. The small figs are collected in March, carefully peeled, then immersed in water until they become soft

and finally boiled with sugar for preserves.—(Landerer, in Arch. d. Ph. cli. 299, 300.)

*Scammony.*—X. Landerer states that the root is first deprived of its juice by incisions, and afterwards boiled in copper vessels to gain an aqueous extract, which is mixed with the juice, not so much as an adulteration, but to render its strong drastic effects milder. He likewise reports the exportation to England of the root.—(Arch. d. Ph. cli. 300, 301.)

*A volumetric estimation of nitrous acid* has been experimented with by Feldhaus. He uses permanganate of potassa, which is added to an acid solution of the nitrite, the nitrous acid of which is oxidized to nitric acid, while protoxide of manganese is formed; the reaction is completed as soon as the acid solution retains the color of the permanganate. The most suitable temperature is 16 to 18° C. (61 to 65° F.). Spirit of nitrous ether may be analyzed in the same way if it is previously decomposed by alcoholic solution of potassa, heated to 212° F., and largely diluted with water. The above temperature must be preserved, but the result is not entirely accurate, because the brown products of decomposition produced by potassa, likewise deoxidize permanganic acid.—(Arch. d. Ph. clii. 34—41.)

*Bitter yeast.*—Landerer supposes the intense bitterness of a yeast of beer to have been produced by *nux vomica*, but inasmuch as no experiment confirmed this supposition, there appears to be not the slightest foundation for it.—(Arch. d. Ph. clii. 41, 42.)

*Examination of extracts by their alkaloids.*—Though he relates no examples, W. Gundermann recommends the following method for this purpose: the extract is rubbed with an equal weight of water, then agitated and set aside with four times the quantity of chloroform; the mixture is now gently heated to separate the chloroform, which is filtered, and the residue again treated with chloroform, all of which is evaporated. The alkaloid is dissolved in an acid, precipitated by ammonia, redissolved in alcohol, and evaporated spontaneously. Tinctures are previously evaporated to a syrupy consistence.—(Arch. d. Ph. clii. 43, 44.)

*Poisoning by cyanide of potassium.*—F. Venghauss obtained from the blood of a man who had died from accidentally drinking a solution of cyanide of potassium, free hydrocyanic acid, but found none therein in combination. The stomach was free from the free acid, a mixture of protosulphate and sesquichloride of iron having been given as an antidote, too late, however, to save life.—(Arch. d. Ph. clii. 138, 142.)

*Hydrocyanic acid from Prunus padus.*—Dr. O. Geiseler distilled from the fresh flowers, an equal weight of water and collected the distillate in 4 equal portions; 1 ounce of the first contained  $\frac{1}{17}$ , of the second  $\frac{1}{25}$ , of the third  $\frac{1}{46}$ , of the fourth  $\frac{1}{69}$  and of the mixture  $\frac{1}{35}$  grain of dry HCy. The leaves collected in July yielded a distillate containing  $\frac{1}{2}$  gr. HCy in the ounce.—(Arch. d. Ph. clii. 143, 47.)

*Deoxidation by protosalts of iron.*—C. W. Hempel found, that protosalts of iron in connection with caustic alkalies reduce bichloride of platinum and of mercury to platinum black and to calomel, which remain behind after the subsequent treatment with muriatic acid. Iodic acid is reduced under the same circumstances, but the liberated iodine reacts with the excess of soda, forming iodate of soda and iodide of sodium, from which, by the addition of sulphuric acid, all the iodine is set free.—(Ann. d. Chem. u. Ph. xxxi. 97, 98.)

*Ferridcyanide of potassium* is obtained according to F. Reindel from ferrocyanide of potassium, sulphuric acid and binoxide of manganiun; also from ferrocyanide of potassium and barium, bisulphate of potassa and the binoxide.—(Journ. f. prakt. Chem. lxxvi. 343.)

*Behaviour of nascent hydrogen to organic compounds.*—A. Genther found that sesquichloride of carbon  $C_4 Cl_6$  is reduced to the protochloride  $C_4 Cl_4$  in the presence of zinc and diluted sulphuric (not muriatic) acid. Bichloride of carbon  $C_2 Cl_4$  is, under the same circumstances with sulphuric or muriatic acid, converted into chloroform  $C_2 HCl_3$ , and, by continued contact, into chloride of methylene  $C_2 H_2 Cl_2$ . Nitrobenzole  $C_{12} H_5 NO_4$  yields anilina  $C_{12} H_7 N$ , and nitrous ether  $C_4 H_5 O, NO_3$  is decomposed into little ethylamina and much ammonia.—(Ann. d. Ch. u. Ph. xxxi. 42—49.)

*Piperidina and piperic acid* have been obtained from piperina and alcoholic potassa by Von Babo and Keller; according to Strecker, the reaction is as follows: piperina  $C_{34} H_{19} NO_6 + 2HO = C_{24} H_{10} O_8$  (piperic acid) +  $C_{10} H_{11} N$  (piperidina,) and piperina has the composition  $N (C_{24} H_9 O_6 + C_{10} H_{10})$ .—(Annal. d. Ch. u. Ph. xxix, 317—320.)

*Test for strychnia.*—Rich. Hagen corroborates Von Sicherer's observation that the color produced by chromate of potassa and sulphuric acid is obscured, or does not appear with nitrate of strychnia in the presence of less or more tartaric acid or tartrates; the reaction is not prevented with free strychnia, nor with its nitrate, if binoxide of lead and sulphuric acid is employed.—(Annal. d. Chem. und Ph. xxvii. 159—164.)

*Estimation of morphia.*—1 equiv. of ferridcyanide of potassium is, according to Kieffer, reduced by alkaline solutions of morphia to the ferrocyanide, producing with sesquisalts of iron Prussian blue. This behaviour is recommended for the quantitative estimation of morphia in opium, by precipitating the meconic acid with chloride of calcium, using an excess of the ferridcyanide and determining the excess by strong hydrochloric acid; the liberated chlorine is now estimated by titration with hyposulphite of soda.—(Annal. d. Chem. u. Ph. xxvii. 271—283.)

*The reaction of pentachloride of phosphorus upon camphor* has been studied by Leop. Pfaundler. When equal equivalents are used, muriatic acid is evolved at  $60^{\circ}$  C., and the yellowish liquid boils at  $83^{\circ}$  C.; thrown in water, a white flocculent precipitate is separated, which is soft like wax, has a camphoraceous odor and crystallizes from alcohol in feathery crystals; its composition =  $C_{20} H_{15} Cl$ . With 2 equiv. of the chloride, the reaction is similar, but the precipitate is oily, and solidifies in a few days; composition:  $C_{20} H_{16} Cl_2$ . The first is neutral, the last deviates polarized light to the left.—(Annal. d. Ch. u. Ph. xxxix. 29—37.)

*On chlorophylle.*—Pfaundler made some experiments with various plants by growing them in distilled water, and feeding them with solutions containing no iron: at first green, they gradually became paler and sickly. The experiments confirm Salm-Horstmar's observations, that iron is requisite, not only for the pro-

duction of the green color, but also for the healthy development of plants. The chlorophylle obtained from about a hundred weight of grass, was freed from some resinous matter by dissolving in muriatic acid and precipitating with water ; it contained 60.8C., 6.4H., and 32.8O, after deducting .037N and .0028 ashes which contained iron. Quercetin colored green by sesquichloride of iron, showed in some respects a similar, in others a different behaviour.—(Ann. d. Ch. u. Ph. xxxix. 37—45.)

*Influence of cyanogen upon iodoform.*—Gilm repeated St. Evre's experiments. A cold alcoholic solution of iodoform becomes reddish-brown by cyanogen, and gradually gelatinizes from the separation of floccules. If now, or from the beginning, heat is applied, the filtered liquid crystallizes, and the mass is silver-white, and possesses metallic lustre. By re-dissolving in alcohol, a few brown floccules remain undissolved, and the liquid yields golden yellow crystals. These and the former are iodoform containing a small portion of a cyanogenous body; bisulphite of carbon dissolves pure iodoform.—(Ann. d. Ch. u. Ph. xxxix. 46—49.)

*Quercetine in buckthorn berries.*—Professor P. Bolley obtains it by exhausting the berries with crude ether, evaporating the ether, precipitating with water, re-dissolving in alcohol and evaporating slowly ; the crystals produce a brick red precipitate with sugar of lead and with nitrate of silver a blood red color, changing to violet, and finally reducing silver, the elementary analysis coincides with quercetine.—(Ann. d. Ch. u. Ph. xxxix. 54—59.)

*Paraffine in boghead slate.*—Merz obtained about  $\frac{1}{2}$  per cent. by exhausting the alcoholic extract with ether and further purifying it. Prof. Bolley thinks it possible that paraffine is not found in coal tar, because it does not pre-exist in the coal.—(Ann. d. Ch. u. Ph. xxxix. 61—68.)

*Tannin in ether.*—Prof. Bolley reports the results of Ott on the behaviour of tannin to ether. Absolute ether dissolves at 5° C. (41° F.) .206 per cent., at ordinary temperature, .384 per cent. tannin ; ether containing 1 per cent by volume of water dissolved at ordinary temperature 12 per cent. The solubility increases with the water, and the tannin on dissolving always turns brown

green. On continuing the addition of tannin, three clear, yellow or greenish yellow strata are obtained; the middle one is a solution of tannin in aqueous ether, the lowest one contained tannin, water and ether and may probably be a compound of tannin and ether.—(See Parrish's Pharmacy, page 377. Ann. d. Ch. u. Ph. xxxix. 63—67.)

*Crystallized compounds of aluminium with metals*, were obtained by Michel, on fusing tungstic acid or perfluoride of molybdenum with kryolite, aluminium and flux, and by fusing the respective chlorides with alkaline chlorides and aluminium. Most compounds are insoluble in cold diluted acids, all lose the aluminium by cold or hot solution of caustic soda. Their respective composition was found:  $\text{Al}_3\text{Ti}$ ,  $\text{Al}_4\text{W}$ ,  $\text{Al}_4\text{Mo}$ ,  $\text{Mn Al}_3$ ,  $\text{Fe Al}_2$ ,  $\text{Ni Al}_6$ .—(Ann. d. Ch. u. Ph. xxxix. 102—105.)

*Acids of benzoin*.—Kolbe and Lautemann observed that different acids are contained in various kinds of benzoin. Some ordinary varieties and tears of unknown origin yielded benzoic acid, while the handsome tears from Sumatra, yielded an acid fusing under water to a clear colorless liquid, probably Strecker's tolurylic acid.—(Ann. d. Ch. u. Ph. xxxix. 113.)

*Acetate of soda*, deprived in vacuo of its 6 equis. water of crystallization, absorbs the same again on exposure to a moist atmosphere without materially altering its appearance. But if obtained in the anhydrous state by fusion or by exposure to 212° F. it may absorb 14 equiv., and crystallization will not take place, unless it is agitated or comes in contact with a solid body or a trace of the other dry acetate. The author, C. S. Reischauer, argues that the so-called supersaturated solutions might probably be viewed as solutions of the anhydrous salts.—(Ann. d. Chem. u. Pharm. xxxix. 116—120.)

*Titration of iodine and bromine*.—The solution of the mixed iodide and bromide is agitated with chloroform, until a little, about the size of a hazlenut, remains undissolved; chlorine water of known strength is added, until the blue color of the chloroform just disappears, when 6 equis. Cl. have been used for 1 eq. I. By more chlorine water, the chloroform turns yellow, orange yellow, and yellowish-white, when 2 Cl. have been used for 1 Br.; with 6 Cl. the yellowish white tint disappears very slowly. The

difficulty to observe the proper shade of color renders this estimation of bromine not very exact, but sufficiently so for all technical purposes.—(A. Reimann in Ann. d. Ch. u. Ph. xxxix. 140—143.)

## GLEANINGS—DOMESTIC AND FOREIGN.

BY THE EDITOR.

*Note on Ants in Texas.*—S. B. Buckley, in the Proceedings of the Academy of Natural Sciences of Philadelphia, for Jan. 29, 1861, gives an interesting account of the Cutting Ant (*Myrmica Texana*) of Texas. Speaking of their habitations or "cities," he remarks: "During the summer I have measured some which extended beneath a surface having an average diameter of 70 feet; and in one instance their town was spread beneath an area of about 100 feet. Their cellars, from six inches to two or three feet in diameter, are beneath this surface to the depth of from 12 to 18 feet. The dirt brought up is in the form of a crater, to the edge of which they carry the ground excavated, where it is dropped, and rolls down the sides of the volcano-like hill, which is seldom more than 18 inches high. The storms level the hills, and new ones are formed on them, until the dirt excavated is sometimes three feet deep." From these residences various lateral subterranean avenues extend to the surface in various directions. It is well known that they store up large quantities of food in the form of grain and other seeds, leaves, &c. They do most of their work at night, especially in the hot season. They can carry the largest grains of corn; and Dr. Buckley, to test their extraordinary powers, tried them with small bits of lead dipped in molasses, which, though three or four times the size of the ants, after much struggling they "succeeded in getting the sweetened metal on their backs, when they marched homeward." They avoid salted provisions. They appear to have a distinct superior class of "big headed" giants, who are apparently rulers, who punish and obtain submission. They avoid low ground, subject to overflow.

The Stinging Ant (*Myrmica malefaciens*) occupy similar cellars and are particularly destructive to grain.

*Value of the Black Currant.*—The *Druggists' Circular*, for April, quoting from a French Journal, informs us that since 1841, at Dijon in France, about two millions of bushes of the Black Currant have been planted with a view to wine making. In some places the grape has given way to this current. Each bush yields about 2 to 5 lbs. of fruit, and the profits of an acre vary from \$100 to \$200. The bushes are planted in trenches four feet three inches apart, and fifteen inches deep, the plants being placed some distance asunder.

*Gun Cotton.*—A writer in the *Archiv. der Pharm.* Dec. 1861, says that it is more difficult to prepare good Gun Cotton for either collodion or explosive purposes, in proportion as the quantity operated upon exceeds an ounce, it being conditional of success that the evolution of red nitrous vapors be prevented, which he finds almost impossible on a large scale.

The proportion found best by the writer was 16 ounces of nitre and 24 ounces of oil of vitriol for each ounce of cotton. He also approves of the temperature of from 150° to 160° F. with five minutes contact, and thorough washing with hot water.  
—*Druggists' Circular*, April, 1861.

*Lithium in fertile soil.*—Prince Salm-Horstmar, (*Pogg. Annalen*), in studying the effects of various salts in contributing to fertility, finds a salt of lithia the most successful. As lithia is now believed to be of almost universal occurrence in soils and ashes, this fact has considerable interest.—*Druggists' Circular*, April, 1861.

*Ozone in the Mineral Kingdom.*—Prof. Schröetter of Vienna, (*Pogg. Annalen*, 1860, p. 561,) says that the odor of certain varieties of minerals when scratched is due to this substance.—*Druggists' Circular*.

*The inflammability of the flowers of Dictamnus albus*, alleged by the daughter of Linnæus, and so frequently doubted since by other observers, has been corroborated by Dr. Hahn, of Hanover, (*Archiv. der Pharm.* 1861,) who found that in a dry season, when a lighted match was held to the stalk below a bunch of flowers, a small reddish strongly smoking flame ran up which did

no injury to the plant, and produced an intensely aromatic odor. The flame is due to a secretion of the nature of volatile oil from glands below the base of the flower, which secretion does not appear until just before the petals fall.—*Druggists' Circular*.

*Dr. Torrey's Herbarium.*—Through the Amer. Med. Times, we learn that Dr. Torrey has presented "his immense herbarium, the fruit of forty years assiduous labor, together with his valuable botanical library," to the Trustees of Columbia College, who have provided accommodations for them, and also a residence for Dr. Torrey in the College. This collection is said to embrace examples of nearly all the collections of Government expeditions, from that of 1819, under Major Long, to the recent results. Besides, the collection embraces numerous specimens from the Floras of Europe, Asia, Australia and South Africa. Dr. Torrey does not propose abandoning his botanical pursuits, but hopes, under the auspices to the College, to prosecute them under more favorable circumstances.

*Detection of Castor Oil in Volatile Oils.*—H. N. Draper proposes to identify this oil when used to adulterate the volatile oils by its quality of yielding oenanthyllic acid by the action of nitric acid. Twenty drops of the suspected oil, in a capsule, is heated until deprived of aroma. To the residue, if any, add five or six drops of nitric acid, and as soon as the reaction has subsided, dilute with solution of carbonate of soda. If castor oil is present, the unmistakable odor of oenanthyllic acid is evolved.—*Dub. Med. Press and Chem. News*.

*Antipathy of Snakes to Garlic and Tobacco.*—According to Dr. Landerer of Athens, (*Buchner's Repert.*) the gardeners of Greece resort to the plan of strewing bruised garlic over their melon and cucumber patches, before collecting their fruit to drive out the snakes which harbor there.—*Druggists' Circular*.

*Production of intense cold.*—By the forcible passage of dry air through a number of small tubes dipping into very volatile liquids, MM. Loir and Orion have succeeded in producing intense cold. With about seven ounces of ether, a temperature of  $-34^{\circ}$  F. can be attained, by which sulphurous acid gas may

224 CHEMICAL ANALYSIS BY SPECTRUM OBSERVATIONS.

be liquefied ; and if this liquid sulphurous acid be used —50° F. is attainable, and when liquefied ammonia is used as the cooling agent, the thermometer indicates —87° which is sufficient to liquefy carbonic acid gas under the ordinary pressure.—*Drug-gists' Circular.*

*Boettger's method of bleaching sponge.*—The softest and cleanest sponges are selected, washed and squeezed out repeatedly in water. They are plunged in dilute hydrochloric acid (1 part of acid and 6 parts of water), in order to separate the calcareous matters. This immersion is for one hour. They are then carefully washed and plunged into a second bath of dilute hydrochloric acid prepared as the first, except that there is added 6 per cent. of hyposulphite of soda dissolved in a little water. The sponges are suffered to remain in this bath for 24 hours. A final washing with water removes the chemical substances, and the sponges acquire by this method a beautiful whiteness.—*Chemist and Druggist, from Rep. de Pharmacie.*

*Breeding of Tapeworm.*—Dr. Butler, (Med. and Surg. Reporter, March 30, 1861), states that Mr. Kuchenmeister has again succeeded in demonstrating that the *Cysticercus cellulosa* becomes metamorphosed into the *Taenia solium* of man. A man under sentence of death, was induced to eat some pork containing Cysticerci. The culprit was executed on March 31st, 1860 ; and on post mortem examination one half of the Cysticerci swallowed were found to have become converted into flat worms. Eleven tape worms, with perfectly developed joints, were found in the intestines, the largest measuring five feet.

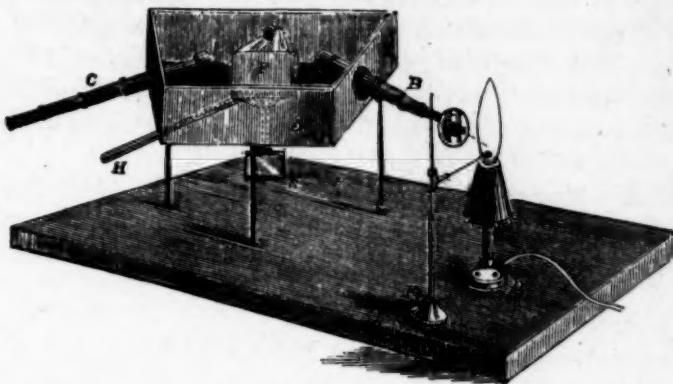
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PROFESSORS BUNSEN AND KIRCHOFF'S METHOD OF CHEMICAL ANALYSIS BY SPECTRUM OBSERVATIONS.

This exquisite method of qualitative analysis is founded on the power possessed by many substances of developing peculiar bright lines in the spectrum of a flame in which they are introduced. The bright lines produced in this manner show themselves most plainly when the temperature of the flame is highest and its illuminating power least: hence Bunsen's gas-burner

which gives a flame of very high temperature and very slight luminosity, is well adapted for experiments on the bright lines of the flame-spectra produced as above described.

The apparatus employed by Messrs. Kirchoff and Bunsen in their spectrum observations is thus represented and described in *Poggendorff's Annalen*, (Bd. cx. § 161):—



A is a box blackened on the inside, having its horizontal section in the form of a trapezium, and resting on three feet; the two inclined sides of the box, which are placed at an angle of about  $58^{\circ}$  from each other, carry the two small telescopes B and C. The eye-piece of the first telescope is removed, and in its place is inserted a plate, in which a slit made by two brass knife-edges is so arranged that it coincides with the focus of the object-glass. The gas-lamp D stands before the slit in such a position that the mouth of the flame is in a straight line with the axis of the telescope B. Somewhat lower than the point at which the axis of the tube produced meets the mouth, the end of a fine platinum wire bent round to a hook is placed in the flame. The platinum wire is supported in this position by a small holder E, and on to the hook is melted a globule of the dried chloride which it is required to examine. Between the object-glasses of the telescopes B and C is placed a hollow prism F, filled with bisulphide of carbon, and having a refracting angle of  $60^{\circ}$ ; the prism rests upon a brass plate, moveable about a vertical axis. The axis carries on its lower part the mirror G, and above that the arm H, which serves as a handle for turning

the prism and mirror. A small telescope placed some way off is directed towards the mirror, and through this telescope an image of a horizontal scale fixed at some distance from the mirror is observed. By turning the prism round every color of the spectrum may be made to move past the vertical wire of the telescope C, and any required position of the spectrum thus brought to coincide with the vertical line. Each particular portion of the spectrum thus corresponds to a certain point on the scale. If the luminosity of the spectrum is very small, the wire of the telescope C may be illuminated by means of a lens, which throws a portion of the rays from a lamp through a small opening in the side of the tube of the telescope C.

From a long series of preliminary experiments with this apparatus, the authors satisfied themselves that the appearance of certain bright lines in the spectra may be regarded as absolute proof of the presence in the flame of certain metals, and that they serve as reactions, by means of which these bodies may be recognized with more certainty, greater quickness, and in far smaller quantities, than can be done by help of any other known analytical method, no matter what may be the nature of the body with which the metals are combined.

The wonderful delicacy of the spectrum-reaction of sodium is evinced by the following experiment, which the writer had the good fortune to witness in the laboratory of Professor Bunsen, in Heidelberg. In a far corner of the experiment room, the capacity of which is about 60 cubic metres, (one cubic metre = 35.3 cubic feet,) was burnt a mixture of 3 milligrammes (0.0462 gr.) of chlorate of sodium with milk sugar, whilst the non-luminous flame of the lamp was observed through the slit of the telescope. Within a few minutes the flame, which gradually became pale and yellow, gave a distinct yellow sodium line, coincident in the solar spectrum with Fraunhofer's dark line D, lasting for about ten minutes, and then entirely disappearing. From the weight of the sodium salt burnt, and the capacity of the room, it was calculated that in one part by weight of air, there was suspended less than  $\frac{1}{2000000}$  of a part of soda smoke. As the reaction can be quite easily observed in one second, and as in this time the quantity of air which is heated to ignition by the flame could be calculated from the rate of issue, and from

the composition of the gases of the flame, the surprising result came out that the eye is able to detect with the greatest ease quantities of sodium salt less than  $\frac{1}{3000000}$  of a milligramme in weight. The reaction of *potassium* is not nearly so delicate; the spectrum contains only two characteristic lines, one in the outermost *red*, and the other far in the *violet* ray of the solar spectrum—points at which the eye ceases to be sensitive to the rays. The presence, however, of  $\frac{1}{1000}$  of a milligramme of the metal could be readily detected. *Lithium* gives two sharply defined lines—the one a very weak *yellow* line, and the other a bright *red* line, both towards the extreme red end of the solar spectrum; though the reaction is not so sensitive as with sodium, it is by far the most delicate test for the metal, the eye being capable of distinguishing with absolute certainty a quantity of carbonate of lithium less than  $\frac{9}{10000000}$  of a milligramme in weight. The authors found to their surprise that lithium, instead of being a rare substance, was a very widely-distributed one, occurring in almost all bodies. They found it in the water of the Atlantic; in the ashes of marine plants; in pure spring water; in the ashes of tobacco, vine leaves, and of grapes; and even in the milk of animals fed on crops growing in the Rhine plain, on a non-granite soil. *Strontium*, *barium*, and *calcium* all give characteristic spectra; that of *strontium* is characterized by the absence of *green* bands. It contains, however, eight remarkable ones, namely, six *red*, one *orange*, and one *blue* line. To examine the intensity of the reaction, Kirchoff and Bunsen threw up into the air of the room, in the form of fine dust, 0.077 grm. of chloride, and thoroughly mixed the air by rapidly moving an umbrella; the line immediately came out, and realized the presence of the  $\frac{6}{100000}$  part of a milligramme of strontium. The *barium* spectrum is distinguished by two very distinct *green* lines, by which the authors were enabled to detect with certainty  $\frac{1}{1000}$  of a milligramme of the metal. *Calcium* gives a broad and very characteristic *green* line, and, moreover, a bright *orange* line lying near the red end of the spectrum.  $\frac{6}{10000000}$  of a milligramme of the chloride of the metal could be easily detected. It is particularly worthy of note that the spectra-reactions of different metals do not interfere with one another; that each being cha-

racterized by some one or more special lines, it is easy to make a qualitative analysis of a compound containing several elements: thus, Kirchoff and Bunsen were enabled to exhibit the reactions of *potassium*, *sodium*, *lithium*, *calcium*, and *strontium*, in several mineral waters; to show the bands of *sodium*, *potassium*, *lithium*, and *calcium* in the ash of a cigar moistened with hydrochloric acid, and to point out differences in the composition of various limestones. But the greatest triumph of the new method of analysis was the discovery of a fourth member of the group of alkali metals. While working on the residue of a mineral water from Kreuznach, a spectrum was obtained which gave lines as simple and characteristic as those of lithium and sodium, but which were *blue*, and were not referable to any known element; these indefatigable chemists evaporated down no less a quantity than *twenty tons* of the water, and obtained 240 grains of the platinum salt of the new metal, which they call *cæsium*, from the Latin word *cæsius*, signifying grayish blue, that being the tint of the two spectral lines which it shows. The new metal is very analogous to potassium, but differs from it in the solubility of its nitrate in alcohol. Its equivalent number is 117, being exactly three times that of potassium. It is scarcely possible to overrate the probable importance to chemical science of this new and beautiful method of analysis. "In spectrum analysis," observe the authors, "the colored bands are unaffected by any alteration of physical conditions, or by the presence of other bodies. The positions which the lines occupy in the spectrum, indicate the existence of a chemical property as unalterable as the combining weights themselves, and may therefore be estimated with almost astronomical precision; it extends almost to infinity the limits within which the chemical characteristics of matter have hitherto been confined. By an application of the method to geological inquiries, the most valuable results may be expected; it opens out, moreover, the investigation of an entirely untrodden field, stretching even beyond the solar system, for in order to examine the composition of a luminous gas, we require, according to this method, only to see it; and it is evident that the same mode of analysis must be applicable to the atmosphere of the sun and of the brighter fixed stars."—*Chemist and Druggist*, Feb. 15th, 1861.

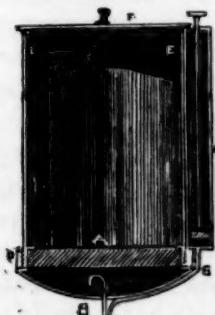
## DAHLKE'S FILTER FOR CHEMICAL LIQUIDS.

The filtering medium patented by Mr. Dahlke was noticed by us at considerable length in a former number.\* We are glad to learn that the favorable estimate we expressed respecting its value is likely to be brought to a very extended trial, Mr. Dahlke having organized a company for the purpose of working out the patent to the fullest extent. The managers have already received orders to fit up the whole of the General Post'Office with filters similar to those supplied to the Drinking Fountain Association.

But our immediate object is an ingenious adaptation of the material to the purification of chemical liquids, for which it is more especially adapted, as being composed of silica and carbon ; it is unacted upon by any ordinary re-agents ; and possessing the capability of being made of any required porosity, it can be used in filtering to any required degree of mechanical purity. In ordinary cases, a separate filter is required for each liquid that has to be purified, entailing a necessity for a considerable number of filters. The inconvenience, which is very great when many liquids have to be dealt with, is entirely obviated by the ingenuity of Mr. Dahlke ; as he has devised a plan, shown in the annexed engraving, by which one filter will answer for a considerable number of liquids ; all that is requisite being to remove the block of silicated carbon and replace it by a second, or even by another filtering substance.

Thus one block of the filtering medium can be kept for each liquid, or for each class of liquids ; and, hence, used with economy, and without the chance of contaminating a simple medicine with any other of a poisonous or acrid character.

To produce rapid action, a syphon, B, is employed, which is brought into action by means of a syringe, C, attached to it and the vessel. Therefore, neither quantity nor weight of the liquid to be filtered will have any influence on the rapidity of the filtration.



\*Vol. i. p. 313.

The lower part of the vessel by being screwed into the upper part, as shown by D, fixes the solid filtering medium, which arrangement allows us to change the latter as often as may be required, and, thus, special filter blocks can be kept for certain valuable liquids.

The apparatus is supplied with a lid, F, to prevent evaporation.

We regard this as one of the most ingenious and practical improvements that have been made for filters for some time, and doubt not that it will come into very general use.—*Chemist and Druggist*, Jan. 15, 1861.

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#### ON THE MATURATION OF FRUITS.

BY MM. BERTHELOT AND BUIGNET.

The changes which fruits undergo during ripening constitute the most remarkable phenomena of vegetable physiology. Nothing is more interesting than to see fruit lose, little by little, its astringent and acid flavor, and acquire the sweet and agreeable taste which renders it fit for food. This change is especially worthy of attention in the case of a fruit detached from the plant on which it was developed. In this case, in fact, the fruit constitutes a complete medium, which derives nothing more from the plant which formed it, all the ulterior changes it undergoes resulting from the reciprocal metamorphoses of its own materials. It is under such conditions that we may hope to study most simply the play of these metamorphoses; to comprehend, for instance, the laws presiding over the formation of vegetable acids and over the saccharine principles.

We have undertaken to make a series of inquiries on this subject, the first results of which we now lay before the Academy. The results were obtained two years since, during the winters of 1858 and 1859. Our reason for mentioning these dates is to show how slow and laborious such researches are; the exact innumerable analyses and experiments, which can only be carried on from year to year, because certain conditions of these experiments are supplied by Nature and cannot be produced at will. In this first paper we propose mainly to develop, by a special example, the methods we employ and the end we have in view, not, however, pretending, as yet, to give definite results.

We have experimented on the common orange, one of the fruits which most distinctly shows the period of maturation. The structure of the orange, the clear distinction between its various parts, the thickness of its rind, which effectually isolates its juice, and, lastly, the relatively rapid period of its artificial maturation, offer especial facilities for observation.

The chemical composition of the juice of the orange adds to these facilities. In fact, the juice is principally composed of citric acid, fermentable sugars, and nitrogenous principles. The gelatinous substances analogous to pectin, which play so important a part in the maturation of certain other fruits, as M. Fremy's researches have shown, exist in the orange, on the contrary, in very insignificant proportions.

The following is our method of operating:—We take a certain number of green oranges, susceptible of the ripening process, and distribute them in two series, one comprising the riper oranges, the other, those less ripe, putting aside a few from each series for analysis. We then leave them for a few weeks in a dry place, maintained at a gentle temperature. At the expiration of this time, if the maturation is effected, we repeat the analysis.

In each of these analyses we have effected the following determinations:—

1. Weigh each orange.
  2. Separate it into four parts, viz., rind, seeds, juice, and pulp. Weigh these four parts, and determine the quantity of water and residue, fixed at 100° C., they contain.
  3. Determine how much azotised and mineral matter, soluble in ether, the dried rind contains.
  4. Determine how much azotised and mineral matter is contained in the pulp.
  5. Pursue the same plan with the seeds, after determining the number and the mean weight.
  6. Estimate the quantity of water, citric acid, inverted sugar, cane sugar, and azotised and mineral matter contained in the juice.
- Relying on these determinations, the total composition of the orange may be ascertained with sufficient exactitude, and the variations undergone by the principles it contains compared.

This comparison leads to divers interesting results, to which we shall presently advert, with further details. The only facts we desire at present to adduce are those relating to the sugary principles. We give them, moreover, as the results of the two series of comparative analyses which we have just indicated, not, however, pretending as yet to generalize them. The questions are too delicate to be decided upon without certain reservations.

1. The orange, either before or at the period of its maturity, contains, at the same time, cane and inverted sugar.
2. The relative proportions of these two sugars change during maturation; the quantity of inverted sugar, which was previously greater than that of the cane sugar, ceases to preponderate; the relations change, and the cane sugar is found to be the most abundant.
3. The weight of inverted sugar varies little.
4. The weight of cane sugar augments relatively to the total weight of the orange.
5. It increases equally, whether compared with the total weight of the juice or with the weight of the fixed matters contained in the juice.

From these facts, it is easy to understand why the orange becomes sweeter during maturation. The formation of cane sugar in the ripening fruit is here the most striking phenomenon. It is the more interesting, since it is effected in an acid medium; not only does the citric acid appear not to act in inverting the cane sugar already formed,—an inactivity which could be foreseen as a result of the experiments made by one of us,—but it does not oppose the augmentation of the cane sugar itself.

We are now continuing our experiments, in order to strengthen these first results by new studies, and to seek out at the expense of what principles cane sugar is formed.—*Chem. News, London, Feb. 23, from Comptes-Rendus*, vol. li.

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#### PAPER FROM INDIAN CORN LEAVES.

Recent experiments have proved Indian corn to possess not only all the qualities necessary to make a good article, but to be in many respects superior to rags. The discovery to which

we allude is a complete success, and may be expected to exercise the greatest influence upon the price of paper. Indian corn, in countries of a certain degree of temperature, can be easily cultivated to a degree more than sufficient to satisfy the utmost demands of the paper market. Besides, as rags are likely to fall in price, owing to the extensive supply resulting from this new element, the world of writers and readers would seem to have a brighter future before it than the boldest fancy would have imagined a short time ago.

This is not the first time that paper has been manufactured from the blade of Indian corn ; but, strange to say, the art was lost, and required to be discovered anew. As early as the seventeenth century an Indian corn paper manufactory was in full operation at the town of Rievi in Italy, and enjoyed a world-wide reputation at the time ; but with the death of its proprietor the secret seems to have lapsed into oblivion. Attempts subsequently made to continue the manufacture were baffled by the difficulty of removing the flint and resinous and glutinous matter contained in the blade. The recovery of the process has at last been effected, and is due to the cleverness of one Herr Moritz Diamant, a Jewish writing-master in Austria ; and the trial of his method on a grand scale, which was made at the Imperial manufactory of Schlogelmulhe, near Glognitz, Lower Austria, has completely demonstrated the certainty of the invention. Although the machinery, arranged as it was for the manufacture of rag-paper, could not, of course, fully answer the requirements of Herr Diamant, the results of the essay were wonderfully favorable. The article produced was of a purity of texture and whiteness of color that left nothing to be desired ; and this is all the more valuable from the difficulty usually experienced in the removal of impurities from rags. The proprietor of the invention is Count Carl Octavio Zu Lippe Wessenfield ; and several experiments give the following results :

1. It is not only possible to produce every variety of paper from the blades of Indian corn, but the product is equal, and in some respects even superior, to the article manufactured from rags.
2. The paper requires but very little size to render it fit for writing purposes, as the pulp naturally contains a large propor-

tion of that necessary ingredient, which can at the same time be easily eliminated, if desirable.

3. The bleaching is effected by an extraordinarily rapid and facile process; and, indeed, for the common light-colored packing paper, the process becomes entirely unnecessary.

4. The Indian corn paper possesses greater strength and tenacity than rag paper, without the drawback of brittleness, so conspicuous in the common straw products.

5. No machinery being required in the manufacture of this paper for the purpose of tearing up the raw material and reducing it to pulp, the expense, both in point of power and time, is far less than is necessary for the production of rag paper.

Count Lippe having put himself in communication with the Austrian Government, an Imperial manufactory for Indian corn paper (*maishalm papier*, as the inventor calls it) is now in course of construction at Pesth, the capital of the greatest Indian corn growing country in Europe. Another manufactory is already in full operation in Switzerland, and preparations are being made on the coast of the Mediterranean for the production and exportation on a large scale of the pulp of this new material.—*American Druggists' Circular, from London Daily Telegraph.*

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#### THE CHROME MINES OF CHESTER COUNTY, PA.

A correspondent of the West Chester Jeffersonian, writing from Hopewell Borough, thus describes the Chrome Works in that vicinity :

Some six miles southwest of this place lie the famous chrome mines, familiarly known as "Wood's Chrome Banks." They and a tract of land are owned by a Mr. Tyson, of Baltimore, Md., properly styled the "Chrome King." To these quarries or mines we paid a visit during the last season, when there were upwards of 70 hands employed in and about the mines, independent of those engaged in hauling the chrome to market. There are two shafts sunk from which the ore or mineral is taken. They have descended to the amazing depth of three hundred feet. The mouths of the shafts have nothing dissimilar in their appearance to that of an ordinary well, probably a little wider. They descend perpendicularly some 75 feet, then strike off in an

oblique direction for a distance, then perpendicularly again, and so on to the bottom of the pits, the men being, as we are told, some fifty yards further south at the bottom than at the entrance. The chrome is drawn up by mule power. Two buckets about the size of a flour barrel are attached to a rope at each end. While one is being emptied, the other is being filled. Some 300 yards distant is the mill for grinding the chrome preparatory to barrelling it. Here they have a water-power excelled by few, having the advantage of all the water of the "Octoraro Creek," if needed. From here there is a shaft that runs (connected by machinery to the mill) to the mine, and there attached to pumps for the purpose of pumping the water from the pits. Strangers are at liberty to descend to the pits, having a torch and a man to lead the way for them; but the "trip" down is a dangerous one, requiring care and caution, as the rounds of the ladder are continually wet and slippery. Owing to the continual drippings, it is a most beautiful place to get a suit of clothes spoiled, and those desiring to see the wonders of underground work had better prepare themselves with an oil-cloth suit. The magnitude of the business done here cannot be well comprehended by the mere reading of a meagre description of it. This is said to be the richest vein in the known world.

Chrome ore is composed of the oxide of iron and chromic acid. This is the acid of all the salts called "chromates," that are now very extensively used in the arts. Chromic acid possesses the remarkable property of igniting ether when brought into contact with it; and some method may yet be employed for using it in the manufacture of igniting compounds as a substitute for phosphorus and the chlorate of potassa. Chromic acid combined with potash is the most common form in which it is used in the arts. In this relationship it is called the bichromate of potash; its color is a deep orange, and in form it is a beautiful crystalline salt. It is used as a mordant for coloring black on wool, and for making black ink when combined with logwood; it colors orange and yellow on cotton goods, and the oxyd of chrome is a common green pigment employed in lithographic, copper-plate, and steel-plate printing. Its green color is very permanent, and this quality renders it well adapted for printing bank notes for which purpose it is now much used. The oxide

of chromium, when reduced to fine powder is one of the best reducing and polishing substances for metals known, and which we think is even superior to the finest emery for polishing steel. The best iridium pointed gold pens become useless when used for writing signatures for a few hours over the green chrome ink that is printed on bank bills.—*American Druggists' Circular from Mining Chronicle.*

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#### GLYCERINE POMADE OF IODIDE OF POTASSIUM.

BY M. THIRIAULT.

This formula is published by the French *Societe d'emulation des pharmaciens de l'est.* It is as follows:

Glycerine (sp. gr. 25 to 30)	grammes	1000.
Sapon. animal. pulv.	"	50.
Potass. iodid. pulv.	"	130.

Dissolve in a water-bath, pour immediately into a warm marble mortar, and triturate briskly for a quarter of an hour. It is then aromatized with two grammes of essence of bitter almonds.

This pomade can be preserved for a very long time without alteration, and should be ranked among officinal medicines. As the iodine salt is present in a state of perfect solution, we can readily understand that it would be rapidly absorbed. There is no repugnance to its employment with any one, since it can be made to resemble in its appearance, consistence and odor, an agreeable cosmetic. It neither colors the skin nor the linen. These are all valuable qualities entitling it to a place in the therapeutic arsenal.—*Répertoire de Pharm.—Journ. and Trans. of the Maryland College of Pharm.* L. H. S.

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#### ON THE MYRONATE OF POTASH FROM BLACK MUSTARD.

BY MM. H. LUDWIG AND W. G. LANGE.

We know, from the researches of M. Bussy, that black mustard does not contain the essential oil ready formed, but that it is produced, in the presence of water, by the action of the myrosine on a particular salt—the myronate of potash. The re-

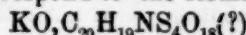
sults of M. Bussy have been confirmed by other authors, who have added several facts relating to the composition and decomposition of the myronate of potash.

To prepare this salt in the state of crystals we commence by macerating the black mustard in two successive portions of rectified spirit and then in two portions of cold water. The myronate is contained in the aqueous liquors. These are evaporated to a syrupy consistence, and the residue heated with weak spirit. The liquid becomes turbid on cooling. It is filtered and concentrated, when a deposit of crystals of myronate of potash takes place. These may be purified by a second crystallization. Five hundred grammes of black mustard have given by this process one gramme of colorless crystallized myronate of potash; 1500 grammes have given 7.5 grammes.

One hundred parts of myronate of potash contain:—

Carbon	.	.	.	.	.	29.98
Hydrogen	.	.	.	.	.	4.91
Nitrogen	.	.	.	.	.	3.97
Sulphur	.	.	.	.	.	14.93
Oxygen	.	.	.	.	.	34.92
Potash	-	.	.	.	.	11.20
						100.00

These numbers correspond to the formula—



When we treat the myronate of potash with recently-prepared myrosine (aqueous extract of white mustard), a strong odor of essential oil of mustard is manifested. The reaction does not give rise to the disengagement of gas. When it has terminated, if we submit the aqueous liquid to distillation, the essential oil of mustard passes over with the water, and a milky acid liquor remains in the retort. This liquid holds sulphur in suspension. It contains some sulphate of potash in solution; but the sulphate equals only a fourth of the sulphur present in the myronate. Evaporated, the liquid in question leaves a residue from which weak spirit extracts some fermentable sugar. When this is converted into alcohol, if we boil the fermented liquid with a few drops of sulphuric acid neutralize with chalk, and add yeast, a fresh fermentation takes place; proving that a new portion of

sugar was formed under the influence of the sulphuric acid. The total quantity of sugar ( $C_{12}H_{12}O_{12}$ ) formed amounts to 44.99 per cent. of the weight of the myronate of potash employed. The myronate, when submitted to the action of yeast, yields no carbonic acid.

In the aqueous solution of myronate of potash, nitrate of silver forms, after some time, a white precipitate. On boiling, this is dissolved, but a black precipitate of sulphide of silver soon forms, and a strong odor of oil of mustard is at the same time manifested. The oil is formed then under these conditions, without the intervention of the myrosine.—*London Pharm. Journ. April, 1861, from Annalen der Chimie, Jan.*

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#### A NEW SALT OF IRON AND QUININE.

(Communicated by Dr. FERGUS, of Marlborough College, to the *Medical Times and Gazette*, March 17.)

It is generally found that a salt of the protoxide of iron is preferable to one of a higher degree of oxygenation; but it is also difficult to obtain an absolutely permanent salt of the protoxide. Perhaps, without exception, the sulphate is the most practically useful of all the salts of iron, owing to the uniformity of its composition. Of the quinine salts, the sulphate is also the most available for general purposes. It is not difficult to form a simple combination of these two sulphates, but the resulting compound is not well fitted for general use. The addition, however, of a certain proportion of sulphate of magnesia, enables us to obtain a salt which is nearly as soluble as the sulphate of magnesia itself—quite unalterable in the solid state, and forming a solution perfectly clear at first, and remaining so for an indefinite period. The iron has no tendency to a further state of oxygenation; the solution has been agitated with oxygen gas, and kept in contact with it for several days, without the least change. A solution of gallic acid tinges a solution of the salt of light bluish color after the lapse of two or three days, and many substances which produce an inky compound with the salts of iron may be mixed with it without causing any change of color.

The proportion of the three sulphates which has been adopted,

is 80 per cent. of sulphate of magnesia, 15 per cent. of sulphate of iron, and 5 per cent. of sulphate of quinine, one scruple containing 16, 3, and 1 grains of the respective salts. These proportions have been found the best for general use, and also for the purposes of manufacture. The proportion of quinine may be increased by prescribing an additional quantity which is readily soluble in the solution of the salt.

One peculiarity is especially deserving of notice; that in this combination the assisting or adjuvant property of both iron and quinine are remarkably developed, the effect of both, particularly of quinine, being heightened in a very marked manner. At the same time, both of the remedies are less apt to disagree with peculiar constitutions which ordinarily refuse to tolerate either iron or quinine. If the heightened power be borne in mind in prescribing this combination, there will be very few cases found in which it will be not be suitable whenever either iron or quinine are indicated.—*London Pharm. Journ.* April, 1861.

## THERAPEUTIC STUDIES ON ESSENCE OF VALERIAN.

BY M. BARAILLER.

The following conclusions have been attained by Barailler;

1. Employed in the case of a healthy man, the essence gives rise to several symptoms, the principal of which are, intellectual sluggishness, drowsiness, deep sleep, reduction in number of arterial pulsations; and, later, an increase and an abundant flow of urine.
2. Given to a sick man, it modifies, in a prompt and rapid manner, the symptoms—stupor, somnolence, coma from some dynamic cause, which complicate severe fevers.
3. This modification is obtained by administering from 50 centigrammes to 1 gramme (from 10 to 20 drops) of the essence in 24 hours.
4. The action of this remedy can only be explained by the employment of the law of similitude, enunciated by Hippocrates and by a number of the ancient authors.
5. Certain nervous conditions, such as vertigo, hysteria, essential asthma, &c., are modified in a remarkable manner by the volatile oil of valerian, which, under the results of a series of new experiments, is capable of extending the sphere of therapeu-

tic applications of this plant very much.—*Journ. and Trans. Md. Col. Pharm.* March, 1861, from *Répertoire de Pharm.* S.

## THE PRODUCTS OF THE DISTILLATION OF ROSIN.

By J. SCHEIL.

The product of the first action of heat on rosin is a mobile liquid of a yellow color, and strong but not repulsive odor; at a higher temperature a thicker iridescent liquid of less agreeable odor, the rosin oil, is obtained.

By repeated fractional distillation the first yields two liquids. One, named *Colophonon* by the author, is colorless, very mobile, of strong refracting power, spec. grav. = .84 at 74° C., and boiling point = 97° (206° F.). It is miscible with concentrated sulphuric acid to a brown liquid, from which water separates a green stratum, resembling thyme and rosemary in odor; hydrochloric acid has a similar result; nitric acid yields a brown resin, and potassium, with the evolution of gas, a brown mass, turning yellow. After heating above its boiling point, with the atmosphere excluded, it has an odor of peppermint. Its composition is  $C_{22}H_{18}O_2$ , the density of its vapor 5.1.

The second liquid is greenish yellow, boils at 160° C. (320° F.) and has the odor and other properties of oil of turpentine; it is probably identical with Deville's terebene. Both liquids are neutral to polarized light.

The crude rosin oil showed the composition  $C_{30}H_{20}O$ ; the refined, which was not iridescent, after remaining in contact with lime for 24 hours, =  $C_{40}H_{28}O_2$ .

The gases, eliminated by the dry distillation, were collected at three different periods. The atmospheric oxygen and nitrogen in the retort remained nearly in the same relative proportion; the first portion of the gases contained 14.96 per cent. carbonic acid, 11.48 per cent. carbonic oxide, and 5.89 per cent. elayle and ditetryle. Towards the close, the free oxygen had nearly disappeared, carbonic acid increased, and a little marsh gas was present; the presence of propylene could not be proved. Notwithstanding a long condensing tube was employed, the gases retain a portion of the liquid hydrocarbons, and it is probable that the disagreeable odor of the light-gas is due to such a body.

—*Ann. d. Chem. u. Ph.*, xxxix. 96—102.

J. M. M.

## ON THE PREPARATION OF LIQUOR POTASSÆ.

BY THEOPHILUS REDWOOD, PH.D.

Professor of Chemistry and Pharmacy to the Pharmaceutical Society.

[NOTE.—The following remarks are taken from an elaborate paper by Dr. Redwood, in the March number of the Pharmaceutical Journal. After discussing the history and some points involved in the process, Dr. Redwood recommended the following process as yielding uniform and satisfactory results.—EDITOR.]

*Liquor Potassæ.*

Take of Carbonate of potash,  
Hydrate of lime, each 3 viiss.  
Distilled Water, Oiv.

Mix the slaked lime with three pints of the water, and put the mixture into a green glass stoppered bottle (a Winchester quart). Dissolve the carbonate of potash in the remainder of the water, and add this solution, in small quantities at a time, to the milk of lime, shaking the bottle for some minutes after each addition; and when the whole of the ingredients have been thus mixed, continue the agitation until a portion of the filtered liquor no longer evolves carbonic acid gas on the addition of an excess of hydrochloric acid. Then filter the solution through calico.

This process differs from that of the present London Pharmacopeia—1st, in the substitution of cold water for boiling water; 2d, in the substitution of hydrate of lime for quick lime; 3d, in the use of an increased quantity of lime; 4th, in the reduction of the quantity of solution ordered to one half (from a gallon to half a gallon). These alterations are important. Thus, by using cold water instead of boiling water, all difficulties in conducting the process, including the selection of a suitable vessel in which to mix the ingredients, are removed. A green glass stoppered bottle, the most appropriate apparatus for the purpose, may be employed, and as the quantity ordered is half a gallon, a Winchester quart bottle, which every druggist has in his store-room, will just hold this quantity. By ordering the lime to be weighed in the state of hydrate, the use of bad lime, and the impurities which accompany it, is to a great extent precluded. By increasing the quantity of lime, provision is made

for the production of the compound of carbonate and hydrate of lime already alluded to, after allowing for some impurity which will be retained even in the hydrate of lime, and also for uncombined water which may be present. Lastly, by reducing the total quantity ordered in the formula, such a quantity is indicated for an operation as can be easily subjected to the active and continued agitation required to effect the complete decomposition of the carbonate of potash within a moderately short time. When good hydrate of lime is used, the decomposition may be effected in about half an hour by continued and very active agitation.

The ingredients being confined in a stoppered bottle, which is itself a measure of the quantity, there are but few probable sources of error in the process or of defect in the product, provided the solid ingredients be in a sufficient state of purity and accurately weighed. If from any cause the process when commenced cannot receive continued attention up to its completion, no evil will arise from the ingredients being left at rest until another opportunity for shaking the bottle presents itself. It must not be supposed, however, that such periods of rest contribute much, if anything, to the decomposition of the carbonate of potash by the lime, as the latter quickly subsides to the bottom of the vessel, and then, of course, ceases to produce any effect upon the carbonate of potash contained in the solution above it. I have found the agitation of the mixture to be most easily effected by placing the bottle on its side, with a folded cloth under it, on a table, and rolling it to and fro with a short quick motion, one hand of the operator being placed over the stopper of the bottle. In operating thus without heat there is not much probability of the stopper becoming fixed in the mouth of the bottle, unless the process be protracted; if, however, the solution has to be kept for any length of time in a well-stoppered bottle, it will be found advantageous to put a piece of thin gutta percha tissue between the stopper and the mouth of the bottle, which will effectually prevent the adhesion of the stopper, which otherwise often occurs. A small quantity of the solution must be filtered from time to time to test it for carbonic acid, and when it has become nearly caustic the filtration of even a drachm or two cannot be well effected through paper without causing the

latter to break, but a small calico filter will be found fully to answer the required purpose. When the solution is found to be perfectly caustic it may either be filtered at once through calico or linen, or the precipitate may be allowed to subside and the clear liquor decanted off. In the latter case, some days should be allowed for the subsidence of the precipitate, the particles of which will become more and more aggregated, thus occupying a smaller space and leaving a larger amount of supernatent liquid. The aggregation of the precipitate will thus take place in time to nearly the same extent as occurs more quickly when the ingredients are boiled together. If the solution be filtered, this may, and indeed should, be done before the precipitate has aggregated into a hard mass at the bottom of the bottle. It does this after standing for some time, and is then removed with difficulty. A calico or linen filter should be used, as neither of these are sensibly acted upon by the caustic solution, especially after they have been once used. When new, a little color is taken from them, and more particularly from the linen, but this is removed by the first portion filtered, or the effect may be prevented by previously washing the filter with some caustic alkali, and the same filter may be afterwards employed repeatedly without any further contamination of the liquid. The filtration will take place most rapidly through the conical filter-bag, commonly called *Hippocrates' sleeve*, which, when used for this purpose, instead of having a hoop to keep the mouth open, should be merely provided with a wide hem having three equidistant openings to admit three pieces of straight glass rod passed through the hem from one opening to another, and these must be long enough to project a little way out of the openings in each direction. Three cords with loops placed over these projecting ends will afford the means of suspending the bag when in use, and on afterwards withdrawing the rods the bag may be easily washed and put away until again required. If it should be thought that this method of filtration would expose the solution too much to the air, a piece of calico or linen may be cut to the form of an ordinary filter, and placed in a funnel covered with a common plate, the neck of the funnel being inserted into the mouth of a green glass bottle intended for the reception of the liquid. In the filtration of Liquor Potassæ, it is

important that the precipitate as well as the solution should be put into the filter. In fact, it is the precipitate that forms the most efficient filtering medium; without it the liquid would not pass through clear; but if the whole of the precipitate be turned into the bag or other filter with the liquid, the latter will almost immediately run through sufficiently clear for use. This filtration or percolation of the liquid through the precipitate also serves to effect the decomposition of any remaining portion of carbonate of potash, if there should be such. I have sometimes completed the decomposition in this way by passing the solution through the precipitate several times, and have found it an expeditious mode of operating.

Liquor Potassæ prepared by this process will be as free from impurity as the nature of the substances used for its production will admit. The alumina always present in the lime, although dissolved to a considerable extent in the early part of the process, before the decomposition of the carbonate of potash is complete, is ultimately precipitated by the excess of lime with which it forms a compound insoluble in the cold. To some extent this precipitation is effected when heat is employed; but in operating with heat, a little alumina is retained in solution. In this case, even repeated agitation after the liquor has cooled does not entirely remove the alumina, unless some fresh milk of lime be added.

The absence of alumina is an important feature in the Liquor Potassæ made by the cold process, and one that will be appreciated by those who have occasion to use it for chemical purposes. To ensure the absence of this contamination, however, it is essential that excess of lime should be used, and this is one of the objects contemplated in augmenting the quantity of lime ordered, and endeavoring to ensure its good quality.

The silica which commercial carbonate of potash contains, will be dissolved by the caustic alkali, and this constitutes one of the usual impurities of Liquor Potassæ. It is stated by some authors that, in the process of boiling, the silica forms an insoluble compound with lime, and is thus removed; but I do not find that this separation is complete. There is a little silica retained in solution, whichever process is adopted, and I cannot discover any difference in the quantity present in solution prepared from the same materials by the different processes.

There are thus, I think, several advantages which attend the preparation of Liquor Potassæ by the process I have described. This process is more easily performed than any of those contained in our Pharmacopœias, and it is less likely to yield products of variable strength and quality. There is one point, however, to which attention must be particularly paid, and that is the condition of the carbonate of potash. I have assumed that the so-called salt of tartar of commerce, which the London College orders, is to be used in the process. This, according to the Pharmacopœia, is a sesquihydrated carbonate, containing sixteen per cent. of water; but as it rapidly absorbs more water on exposure to the air, it cannot be relied on as a definite compound in the state in which it is met with in commerce. Unless it be perfectly dry, and does not in the least adhere to the bottle containing it, it should not be used without being previously heated with constant agitation in a porcelain dish placed over a water-bath. It is readily tested with regard to the water it contains by the means indicated in the Pharmacopœia. One hundred grains of it, on being heated to redness, should lose sixteen grains.

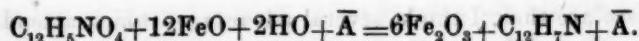
The proposed formula for Liquor Potassæ is so constructed that, if troy weight be used, the solution will be identical in strength with that now ordered in the London Pharmacopœia, but if the avoirdupois ounce be substituted for the troy ounce, the strength of the solution will be slightly reduced, so that one hundred grain-measures of it will contain five grains of anhydrous potash (KO), and the specific gravity of this solution will be 1.053.—*London Pharm. Jour.*, March, 1861.

#### ON THE PREPARATION OF ARTIFICIAL COLORING MATTERS WITH THE PRODUCTS EXTRACTED FROM COAL TAR.

By M. E. KOPP.

(Continued from page 136.)

3. *Reduction of Nitrobenzole by Ferrous Acetate.*—Ferrous acetate reacts on nitrobenzole and converts it into aniline, while the sulphate, chloride, and oxalate of iron have no action on it. The reaction is represented by the formula—



One part of nitrobenzole is placed in a retort with an aqueous solution of acetate of iron. The retort is then heated over a water-bath for several hours, and then the contents are filtered—being diluted with water if they have become pasty. The residue left on the filter, which is principally hydrated peroxide of iron, is washed with boiling water. The filtrate and washings are then distilled, the condensed products being water, acetic acid, and acetate of aniline. These may be again distilled with strong sulphuric acid (using four-tenths the weight of the nitrobenzole employed) to recover the acetic acid and form sulphate of aniline, and the latter may be decomposed by caustic potash and the aniline distilled off. This process has not been found advantageous, and has consequently been given up.

4. *Reduction of Nitrobenzole by means of Arsenite of Potash or Soda.*—This process was invented by Wohler. He digested nitrobenzole with a solution of arsenious acid in a strong ley of caustic soda, or placed the arsenical solution in a tubulated retort, heated it to the boiling point, and then allowed the nitrobenzole to fall in drop by drop. Under these circumstances nitrobenzole is transformed into aniline which distils over, and it is only necessary to saturate with an alcoholic solution of oxalic acid to obtain perfectly pure oxalate of aniline.

The last method of forming aniline we shall quote, is that of Schlagdenhausen, who has shown that it is produced when nitrobenzole and sulphide of carbon are heated together in a sealed tube to 160°.

**PROPERTIES OF ANILINE.\***—Aniline when pure is a colorless liquid, very astringent, having an aromatic odor, and an acrid burning taste. It is slightly soluble in water, and very soluble in alcohol and ether. Its sp gr. = 1.028; at —20° it does not freeze. It boils at 182°, and distils unchanged. When warmed, it dissolves sulphur and phosphorus. It is a powerful base, combining with acids to form salts, which in general are soluble. It decomposes ferrous and ferric salts, and the salts of zinc and alumina, precipitating from them the metallic oxides. It also

\*Gerhardt, *Chimie Organ.* iii. p. 84.

precipitates the chlorides of mercury, platinum, gold and palladium; but it does not precipitate the nitrates of mercury and silver.

Aniline easily oxidizes, turning yellow in water, and in time becomes resinified.

When aniline dissolved in hydrochloric acid is acted on by chlorine the solution takes a violet color, and on continuing the current of chlorine the liquid becomes turbid, and deposits a brown-colored resinoid mass. On submitting the whole to distillation, vapors of trichloraniline and trichlorophenic acid pass over.

A solution of the alkaline hypochlorites colors aniline a violet blue, which passes rapidly to a pale red, especially in contact with acids.

A mixture of hydrochloric acid and chlorate of potash act on aniline, the final result of the action being chloranile  $C_{12}Cl_4O_4$ , but in the course of the reaction several colored intermediary bodies are formed.\*

If a solution of chlorate of potash in hydrochloric acid be added to a solution of a salt of aniline mixed with an equal volume of alcohol, and care is taken to avoid an excess of the hydrochloric solution, a flocculent precipitate is deposited after a time of a beautiful indigo blue; this precipitate filtered and washed with alcohol contracts strongly, and the blue color passes to a deep green. The filtered liquid has a brownish-red color; on boiling it, adding fresh quantities of hydrochloric acid, and chlorate of potash, a yellow liquor is obtained which deposits crystallised scales of chloranile.

An aqueous solution of chromic acid gives with solutions of aniline a green, blue or black precipitate according to the concentration of the liquors.

When a small quantity of an aniline salt is mixed in a porcelain dish, with a few drops of strong sulphuric acid, and a drop of a solution of bichromate of potash is allowed to fall on the mixture, a beautiful blue color appears after some minutes, which, however, soon disappears.

Dilute nitric acid combines with aniline without altering it

\*See *Chem. News*, vol. ii. p. 195.

immediately; but after some time nitrate of aniline crystallizes in the form of concentric needles, the mother liquor turns red colored, and the sides of the capsule become covered with a beautiful blue efflorescence. When a few drops of strong fuming nitric acid are poured upon aniline it is immediately colored a deep blue; on applying heat the blue tint quickly passes to yellow, a lively reaction is manifested, which results in the formation of picric or trinitrophenisic acid.

Potassium dissolves in aniline, disengaging hydrogen, whilst the whole becomes a violet colored pap.

The other reactions of aniline, which are characterised by the formation of anileine, fuchsine and azaleine, will be related in a future number, when describing the processes for the preparation of these substances. But before commencing these we may just glance at some of the properties and derivatives of binitrobenzole.

Binitrobenzole, as before stated, is formed when nitrobenzole is added drop by drop to a mixture of equal parts of fuming nitric acid and sulphuric acid as long as the liquids will mix. If such a mixture be boiled for a few minutes it becomes on cooling a thick magna of binitrobenzole, which is easily purified by repeated washings with water. A single crystallization from alcohol will furnish the body in long brilliant prisms which melt at a temperature above  $100^{\circ}$ , and crystallize again on cooling, in a radiated mass.

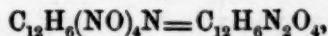
Binitrobenzole is very soluble in warm alcohol. When a plate of zinc well cleaned is placed in a cold alcoholic solution of binitrobenzole and hydrochloric acid is added by degrees, we observe that the disengagement of hydrogen, which at first takes place, soon ceases, and at the same time the liquid gradually takes a crimson-red tint.\* The reaction being completed, the excess of zinc is removed and the liquor is saturated by an alkali, which precipitates the oxide of zinc colored a deep purple. The precipitate is collected on a filter and washed with alcohol. By distilling the highly colored alcoholic washings, washing the residue with cold water, then redissolving it in alcohol and evaporating it afresh to dryness, the new matter is obtained perfectly pure. The authors have given it the name

\*Church and Perkin, *Quart. Journ. Chem. Soc.* ix. p. 1.

of nitrosophenyline. It has the formula  $C_{12}H_6N_2O_2$ . When obtained as above, it is a black, shining, substance; when heated, it fuses and decomposes directly: it is almost insoluble in water, but freely soluble in alcohol and acids. An alcoholic solution containing only 0.2 per cent. is so deeply colored that by reflected light the solution seems opaque and of an orange red.

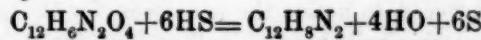
Concentrated hydrochloric acid and dilute sulphuric and nitric acids form magnificent crimson red solutions with nitrosophenyline, which is precipitated from them again unchanged by alkalies.

Binitrobenzole treated with an alcoholic solution of sulphide of ammonium is at first converted into nitraniline,—

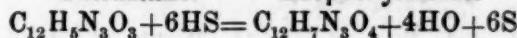


that is to say aniline, in which one equivalent of hydrogen is replaced by one of nitrous vapor. Nitraniline crystallizes in yellow needles which stain the epidermis like picric acid.

There is a second aniline compound in which two equivalents of hydrogen are replaced by two equivalents of nitrous acid, dinitraline  $= C_{12}H_6N_2(NO_2)_2$ . By the prolonged action of sulphuretted hydrogen and ammonia on nitraniline and dinitraniline two new bases are produced,—azophenylamine and nitrazophenylamine. The following equations express the re-actions which take place:—



Nitraniline. Azophenylamine.



Dinitraniline. Nitrazophenylamine.

The second of these bases, nitrazophenylamine, merits some attention, inasmuch as it offers some resemblance to the colored derivatives of aniline. It is prepared in the following manner: \* Dinitraniline is boiled for two hours with a great excess of sulphide of ammonium. The liquid soon becomes dark red; the yellow crystals of dinitraniline disappear, and are succeeded by a network of delicate needles, of a deep red color, the quantity of which is much increased on cooling the liquid after the

\*Gerhardt, *Chimie Organ.*, iii. p. 105; Gmelin's "Handbook," xi. p. 294.

reaction has terminated. Oxalic and hydrochloric acids dissolve the nitrazophenylamine, leaving the precipitated sulphur, and also a secondary crystallized product of a dirty green color. The base may be obtained pure by precipitating a boiling oxalic or hydrochloric solution with ammonia and re-crystallizing two or three times from a solution in hot alcohol. In this way nitrazophenylamine is obtained in long slender needles, united in groups, having a clear red color when dry, and showing a golden iridescence. Water, alcohol, and ether easily dissolve it, and the concentrated solutions are of a deep red color. It melts at a high temperature, and the greater part is volatilized apparently without alteration. Heated suddenly, it slightly explodes, leaving a carbonaceous residue.

The salts of nitrazophenylamine are very beautiful compounds, characterized by a dichroism which causes a peculiar iridescence in reflected light. All the salts must be crystallized in the presence of an excess of acid, since both water and alcohol decompose the neutral salts.

Fuschine prepared by chloride of tin, according to the process of MM. Renard and Franc, appears to be the hydrochlorate of a base, the properties of which greatly resemble those of nitrazophenylamine. The crystallized salts show the same colored reflections, and are decomposed (in part at least) by water and alcohol, the solutions being of a deep red color.

We now proceed to notice the processes for the preparation of coloring matters by means of aniline, and the method of employing them for dyeing fabrics and yarns.

The first on the list is that of Mr. Perkin, for the preparation of aniline, violet or mauve. A cold solution of sulphate of aniline (rough aniline is used) and a cold solution of bichromate of potash are mixed together and left for ten or twelve hours. An abundant deposit of a black powder is thus obtained, which is separated, well washed with water, and lastly, dried at 212°. The dried substance is then digested several times with naphtha or commercial benzole, which dissolves a brown tarry or resinous substance, contaminating the coloring matter in the deposit. The residue insoluble in the naphtha is dried again, and then digested with wood spirit or alcohol, or any other liquid able to dissolve the coloring matter. This clear solution is decanted

and distilled to recover the solvent. The residue of the distillation is aniline, or aniline violet.

Mr. Perkin gives the following directions for dyeing with aniline :—To dye a lilac or a purple, an alcoholic solution of the coloring matter is added to a boiling dilute solution of oxalic and tartaric acids, and when the mixture has cooled, the materials to be dyed (silk, cotton, &c.,) are to be completely immersed in the bath. Mr. Perkin's patent is dated August 26, 1856. In the early part of 1859, M. Verguin, a chemist at Lyons, while experimenting with aniline, discovered a process for converting it into a magnificent purple-red coloring matter. M. Verguin sold his process to MM. Renard and Franc, who patented the process in France, on the 8th of April, 1859, and gave the new coloring matter the name of Fuchsine. The process is as follows :—A mixture of ten parts of aniline with six or seven of anhydrous chloride of tin is boiled for fifteen or twenty minutes. The mixture at first turns yellow, then becomes reddish, and ends by assuming a beautiful red color when seen in thin layers; in the mass it appears black. Water is now added, and the whole is heated to ebullition. It is then removed from the fire, allowed to rest a moment for some insoluble matters to deposit, and then filtered while still hot; the residue is exhausted by another boiling with water. The filtered liquor contains the coloring matter in solution. To separate it, advantage is taken of its being insoluble in a saline solution; accordingly, chloride of sodium or a neutral tartrate of potash or soda, in a solid state, is added to the liquor, and as the salt dissolves, the coloring matter is deposited. It may then be separated by decantation or filtration.

Fuchsine may be employed for dyeing either in aqueous solution, without a mordant, or with the ordinary saline or acid mordants, always excepting the mineral acids, which alter the color.

A red color is also obtained by acting on aniline with other anhydrous metallic chlorides, bichloride of mercury, perchloride of iron, protochloride of copper, for example. In October, 1859, MM. Renard and Franc added to the above three anhydrous chlorides, the hydrate of bichloride of tin, as being equally able to change aniline into fuchsine. A second addition to their

patent, in November, 1859, extended the list of colorigenous agents, by including the stannous and stannic sulphates, the mercurous and mercuric sulphates, the mercurous and mercuric nitrates, nitrate of silver, titanic chloride, mercuric fluoride, stannic and mercuric bromides, and stannic iodide. A third addition, in the same month, added the ferric and uranic nitrates, uranic chloride and mercuric chlorate, bromate, and iodate. Sesquichloride of carbon and iodoform were afterwards added in December of the same year. Lastly a fifth addition was made in February, 1860, the purport of which the author does not exactly know, but which, he believes, includes iodine, arsenic acid, and nitric acid.

We must here quote from a paper by Dr. Hofmann, presented to the Academy of Sciences, on September 20th, 1858,\* and entitled, "Contributions to the History of the Organic Bases, iv. Action of Bichloride of Carbon on Aniline:"—\*

"At the ordinary temperature of the air, aniline and bichloride of carbon do not act on each other. At 100° C. the mixture begins to change; but after digesting for some days, the change is far from being complete. By submitting, however, a mixture of one part of bichloride of carbon and three parts of aniline, the two bodies being in the anhydrous state, to a temperature of 170° or 180° (the boiling point of aniline) for nearly thirty hours, the liquid is changed into a blackish mass, soft and viscous, or hard and brittle, according to the duration of the temperature. This blackish mass is a mixture of several bodies. By exhausting with water a part is dissolved, another part remaining insoluble in a resinous state. With the aqueous solution potash gives an oily precipitate, which contains a considerable proportion of unchanged aniline. On distilling this oily matter with diluted potash, aniline passes; while a viscous oil, which solidifies by degrees, remains behind. Repeated washings with cold alcohol, and one or two crystallizations from boiling alcohol, render the body perfectly white and pure; a very soluble substance of a *magnificent crimson color* remaining in solution.

The blackish portion of the mass which remains insoluble in water, is easily dissolved by hydrochloric acid; from this solution it is again precipitated by alkalies, as a dirty-red amorphous powder soluble in alcohol, and forming a *rich crimson colored solution*. The greater part of this coloring matter is the same as that which accompanies the crystalline fatty body, considerable quantities of this latter substance being sometimes found in the product insoluble in water."

The great resemblance between the experiments of Dr. Hof-

\**Comptes-Rendus*, t. xlvi. p. 492.

mann and the process of MM. Renard and Franc is evident. If, as appears from the fourth addition to their patent, fuchsine may be prepared by boiling sesquichloride of carbon with aniline, it is quite clear that Dr. Hofmann had fuchsine in his hand, and that it is identical with the substance which gave a magnificent crimson solution. It is right, however, to add, that if Dr. Hofmann was the first who obtained fuchsine as a secondary product in his theoretical experiments, M. Verguin has certainly the merit of having modified the process, so as to make it capable of industrial application.

In October, 1859, M. Gerber-Keller patented in France the preparation of a red coloring matter, which he called Azaleine, "by means of aniline treated under the influence of heat, and in proper proportions with several salts which are formed by the oxyacids of nitrogen, sulphur, chlorine, bromine, and iodine with metallic oxides." We shall complete this too concise and consequently obscure description of the process by adding what is known respecting the preparation. The salts preferred by the author are the mercurous and mercuric nitrates. Aniline is carefully heated to about 150° C., and nitrate of mercury in powder is then dropped in, a small quantity at a time. A higher temperature than 150° must be avoided, or the action becomes too violent, and the coloring matter destroyed. At every addition of the mercury salt a sort of ebullition is produced, the consequence of the reaction which takes place; metallic mercury is deposited at the bottom of the vessel, and the liquor gradually acquires a deep crimson color. After being decanted, the whole is allowed to cool, and the coloring matter is now washed with a little water and dried. It is then freed from tarry matters by repeated washings with commercial benzine, and finally dissolved in alcohol or wood spirit, the solution being re-precipitated with water, &c., again and again until the product is sufficiently pure. Absolute purity is not necessary for either dyeing or printing.

Azaleine is soluble in water, but much less so than in alcohol. For dyeing silk and wool, alcoholic solutions are preferred; for printing on cotton, a dilute alcoholic is thickened with gum.

We have recently heard that the process now employed by M. Gerber-Keller is the following:—10 parts of aniline are

heated on a water-bath to 100°, and 7 parts of mercuric nitrate, dry and in powder, are added by degrees. The mixture is maintained at the temperature of 100° for eight or nine hours, in which time the mass will have become of a magnificent violet-red color. On cooling it forms a thick paste. The greater part of the reduced mercury is found at the bottom of the vessel. To employ the azaleine then produced as a dye or for printing, it is only necessary to treat the pasty mass with boiling water, a mixture of water and alcohol, acetic acid, or any other solvent, and make use of the solution.

The advantage of the last process consists in the moderate heat required, a high temperature seeming to cause the formation of tarry matters.

M. Albert Schlumberger has also described (*Bulletin de la Société Industrielle de Mulhouse*, March 1860, p. 170) a process for converting aniline into a red coloring matter by means of the neutral nitrate of mercury. He takes 100 parts of anhydrous aniline, and 60 parts of the nitrate of mercury, and heats the mixture to boiling. The mass slowly changes color, at first becoming brown, but in time the whole is transformed into a beautiful red liquid. The operation is finished when the boiling materials are observed to swell up and disengage yellowish vapors. The mass so obtained is washed with two or three times its volume of boiling water, to remove the oils which are not completely metamorphosed, and then boiled two or three times with water to extract the coloring matter.

In this process, as well as in the preceding, the whole of the mercury is recovered.

In May, 1860, MM. Girard and Delaire obtained a patent for the use of arsenic acid in the preparation of a red coloring matter from aniline. They introduce into a distillatory apparatus 12 parts of dry arsenic acid and 12 parts of water. When the hydration of the arsenic acid is complete, they add 10 parts of aniline, and shake the whole well together. The mass becomes homogeneous, pasty, and almost solid. A gentle heat is then applied, so as to raise the temperature of the mixture gradually. The mass now becomes liquid. When the operation is properly conducted, only water and a very small quantity of aniline distil. At 120° a great part of the aniline

is changed into the coloring matter, and care must be taken to keep the mixture at this temperature for some time. The heat may then be increased, but it must never pass 160°. The operation lasts four or five hours.

In the above way a perfectly homogeneous mass is obtained, which is fluid above 100°. On cooling it solidifies, and has the appearance of a hard, brittle substance, with a bronze lustre. It is very soluble in water to which it communicates a pure red color, so deep that concentrated boiling solutions appear black. The solutions may be used for dyeing directly without fear, for the tissues will not retain a trace of the arsenic. If necessary, the arsenic may be easily removed from the coloring matter by one of the following processes :—

1. Powder the rough product and treat it with strong hydrochloric acid ; then dilute with water, and saturate the clear solution with a slight excess of soda. The coloring matter is precipitated, while the arsenic remains in solution in the alkali, and it is only necessary to wash the precipitate once or twice with cold water to obtain the coloring matter quite pure.

2. The rough product dissolved in water is treated with a quantity of quick lime corresponding to the arsenical compounds it contains, *plus* a slight excess. The coloring matter is precipitated, as well as the arsenical compounds,—the latter in the form of insoluble calcareous salts. The liquor and the precipitate (unseparated) are now treated with carbonic, acetic, or tartaric acid, either of which will dissolve the coloring matter and leave the arsenic.

In this process aniline gives about its own weight of coloring matter.

The process of MM. Depouilly and Lauth, "for the manufacture of various colored products derived from aniline," is very similar to that of Mr. Perkin. They take a solution of a salt of aniline and treat it with a solution of chloride of lime. The first drops of the chloride produce a violet coloration, and, on continuing the addition of the re-agent, a deep violet precipitate is formed, which constitutes the coloring matter. This is collected and washed with slightly acidulated water. When the washings are uncolored, the precipitate is collected on a fil-

ter, and drained. It is then dissolved in a strong acid—sulphuric, for example—and re-precipitated by the addition of a large quantity of water, or by an alkaline solution. The product is thus obtained sufficiently pure for sale. For dyeing and printing, alcoholic, acid, or aqueous solutions may be used, according to the nature of the article to be dyed and the purity of the color required.

The next patents referred to by the author are those of Messrs. Beale and Kirkham, Mr. Kay, Mr. Price, and Mr. G. C. Williams, which have been already described in the *Chemical News*, (vol. i. pp. 9, 74, 81.)

(To be continued.)

#### PLASMA PLUMBI.

BY CHARLES S. TILYARD.

Read before the Maryland College of Pharmacy, Feb. 14th, 1861.

In a former number of the Journal the writer suggested a combination of Goulard's extract of lead with glycerine (glycerole of lead) as a substitute for Goulard's cerate.

The fluidity of that compound has been found an objection to its application in some cases, and has led him to modify it by combining the extract with plasma. The result is a preparation of the consistence of an ointment which may be modified at pleasure by increasing or diminishing the quantity of starch or arrow root.

Take of Glycerine,	2 fluid ounces.
Sol. subacetate of lead,	3 " drachms.
Camphor,	10 grains.
Bermuda arrow root,	1½ drachms.

Rub the arrow root into a fine powder and having mixed the glycerine and extract of lead, stir it into the mixture. Pour the whole into a capsule and heat over a spirit lamp *cautiously, constantly stirring*, until it becomes transparent, and assumes the consistence of paste. Having powdered the camphor by means of a few drops of alcohol, rub a little of the plasma with it in

a mortar until well incorporated, then add the remainder, and stir a few minutes.

When first made, it is viscid and ropy, but in a day or two loses these properties, and becomes at the ordinary temperature (say 60° F.) of the consistence of a soft ointment.—*Journ. and Trans. of the Maryland College of Pharmacy, March, 1861.*

#### ON BERBERINA AND ITS SALTS.

By L. HENRY.

The author prepared the alkaloid by Fleitmann's process, and adds to its known properties that it has no action on polarized light, and that it readily yields supersaturated solutions; its composition is  $C_{42}H_{19}NO_{10}$ . The following salts were prepared and analyzed:

Hydrobromate of berberina is slowly precipitated by the acid from an aqueous solution of the alkaloid, and crystallizes from alcohol in pale yellow needles, soluble in water and alcohol; when dried between 100 and 110° C. (212 and 230° F.) the salt is anhydrous.

Hydriodate of berberina prepared like the former, is nearly insoluble in alcohol, soluble in 2130 parts of water, crystallizes in small reddish yellow needles, and has the same composition.

The hydroferrocyanate is obtained by double decomposition; it is little soluble in water and alcohol, and crystallizes in greenish-brown microscopic needles; dried below 120° C. (248° F.) its formula is  $2(C_{42}H_{19}NO_{10}, HCy) + FeCy$ . The hydroferrocyanate resembles this salt, but possesses, after drying, an apple green color; composition =  $3(C_{42}H_{19}NO_{10}, HCy) + Fe_2Cy_3$ .

The double chloride of gold is precipitated from diluted solutions with constant agitation. It is a brown amorphous powder, somewhat soluble in boiling concentrated muriatic acid, and in a mixture of this acid and alcohol, from which solution it separates in floccules consisting of microscopic needles; light decomposes it slowly; the dry salt is  $C_{42}H_{19}NO_{10}, HCl + AuCl_3$ .

The picrate crystallizes from boiling alcohol, in which it is

but little soluble, in golden yellow laminae, which after drying have the composition  $C_{42}H_{19}NO_{10}$ ,  $C_{12}H_2(NO_4)SO$ .

Acid succinate of berberina appears after several recrystallizations in brownish needles, affording a yellow powder, soluble in water and alcohol; its formula is  $=C_{42}H_{19}NO_{10}$ , HO,  $C_8H_4O_6$ .

The bitartrate yields silky yellow needles, soluble in 130 parts of cold water and strong alcohol; it is composed of  $C_{42}H_{19}NO_{10}$ , HO,  $C_8H_4O_{10} + HO$ , the water of crystallization is driven off at  $212^{\circ} F$ .

The binoxalate consists of minute brownish needles in wart-like groups and yields a yellow powder.\*

By double decomposition and recrystallization from alcohol, the hydrocyanate is obtained as brownish yellow scales, yielding a greyish powder, which is anhydrous after drying below  $110^{\circ} C$ ., and decomposes spontaneously when in the moist state. The hydrosulphocyanate is in yellow or brownish yellow needles, little soluble and anhydrous.

Hydrochlorate of berberina readily yields crystallizable double

\* There is evidently a mistake in some of the author's calculations and formulæ, which erroneously give to some salts 2 equiv. water of constitution and to the picrate 1 equiv. Tartaric, succinic and oxalic acids being bi-basic, require only 2 equiv. of base, not 3 equiv. as figured out by the author; so does picric acid require but 1, not 2 equiv. I annex here my recalculations, together with the author's results and his calculations for an additional equiv. HO.

		Henry.				Henry.	
Bisuccinate.		Calcul.	Found.	Bitartrate.		Calcul.	Found.
C <sub>50</sub>	300	63.29	62.11	61.99	C <sub>50</sub>	300	58.25
H <sub>24</sub>	24	5.06	5.17	5.80	H <sub>24</sub>	24	4.66
N	14	2.96			N	14	2.72
O <sub>17</sub>	136	28.69			O <sub>21</sub>	168	32.62
					HO	9	1.75
		474	100.00				
						515	100.00

		Henry.				Henry.	
Binoxalate.		Calcul.	Found.	Picrate.		Calcul.	Found.
C <sub>46</sub>	276	61.88	60.66	60.78	C <sub>54</sub>	324	55.38
H <sub>20</sub>	20	4.49	4.61	4.67	H <sub>21</sub>	21	3.59
N	14	3.14			N <sub>4</sub>	56	9.57
O <sub>17</sub>	136	30.49			O <sub>23</sub>	184	31.46
		446	100.00			585	100.00

The formulæ as recalculated, it will be seen, agree pretty well with the author's results, though some of the salts may possibly retain 1HO at 100 or  $110^{\circ} C$ .

J. M. M.

salts with metallic chlorides ; the platinum double salt has the composition  $C_{42}H_{19}NO_{10} \cdot HCl + PtCl_2$ .—(Bull. de l' Acad. Roy. Belg.—Annal. d. Ch. u. Ph. xxxix. 132—140.)

#### DESCRIPTION OF THE HIMALAYAN MUSK DEER, ITS HAUNTS, AND THE METHOD OF TAKING THE MUSK;

Accompanying a stuffed specimen of the animal presented to the Museum of the Pharmaceutical Society by Messrs. Peake, Allen & Co.

By M. F. PEAKE.

The specimen before the meeting probably will serve to clear up many points relative to the quality and appearance of musk, and to explain the difference, and cause of there being so many varieties and qualities in the market.

The deer, as you perceive, is about the size of a greyhound, and, from the length of its tusks, it is no doubt five or six years of age, or perhaps more. Its brown stubby coat more resembles small porcupine quills than hair, and every part of the animal has a strong odor of musk. The head, legs, feet, and general outline, are those of the common deer ; but in its habits it more resembles the hare, selecting a solitary place or form separate from its species. It is sometimes found in the lower ranges of the mountains, at an elevation of 7,000 to 8,000 feet. It is an inhabitant of the forest, but partial to woody ravines, and is common only on the spurs or projecting points jutting from the eternal snowy ranges, at an altitude of from 10,000 to 14,000 feet.

The natives take the musk deer by snaring, but this specimen was, it is believed, shot by the rifle. On being approached, they bound off with great rapidity, and when at about eighty to one hundred yards, turn round for a few seconds to gaze on their disturber with their faces towards him ; at this instant the unerring aim is taken, but the prize is not always secured, as sometimes it falls down precipices where it cannot be reached. Days and days are frequently lost without falling in with any, and, on an average, upwards of thirty miles are traversed daily.

The toil of getting up and down these immense mountains is very great, and the pursuit is attended with many hardships and privations. The time expended and distance traversed render the occupation very expensive, from the necessity of being ac-

companied by various grades of servants, some to hunt up and look out for game, others to carry provisions, cooking utensils, &c.; consequently, genuine musk must always maintain a high rate.

It will be seen that there is a thin membrane under the outer skin of the abdomen, of a small bladder-like appearance, containing a thickish soft substance, which is the musk. The musk in each membranous pod usually weighs from two drachms to an ounce; from an old deer, from one ounce and a half to two ounces; and its odor increases in proportion to the age of the animal. The male only furnishes the musk; at the age of twelve months and under it does not yield any, and it is only at three years that the pod contains sufficient to be worth the trouble of extracting. The practised eye can generally judge if it be a young one—if so, it is allowed to escape. At two years the pod contains a yellowish milky substance, and, when first changed to musk, it yields not more than two drachms, frequently less.

A few extracts from our Himalayan correspondent's letters may more clearly illustrate its character:—

“One or two small parcels I have sent to London have had a preference in the market even to the best Assam. About sending it in pods with the hair on? I will do so if you like, but I would not recommend it, as my musk is genuine just as it is taken from the animal. The thin bladder-like skin dries in the sun in a few hours—that in the hairy pods, on the contrary, gets quite roasted in the process of preserving and preparing.

“The native plan is to make a stone nearly red hot, and the pod is first applied to it inwardly and outwardly till the skin is nearly dry, when it is stitched up, and the navel side is then held to the stone, pressing it and closing it with considerable force till the pod is quite dry. If this was not done, putrefaction would ensue, which, though only of the skin, would not improve the musk.

“I sent both kinds home, to ascertain which was best, and that in the pods without the hairy skin was declared to be far superior. All came from the same place, and from animals killed the same season.”

In a letter of a former year he states:—

"I send you an account of the season's produce—viz. 120 pods, which weigh about 110 to 120 ounces or more, as they are large. The small ones being nearly all skin, I thought it advisable to let the natives have them to dress in their way and to sell to natives."

The musk pod familiar to us all is this membranous bladder, cut from the deer with a portion of the outer skin; it is pressed and stitched up, and dried on a hot stone. By this continued heat much of its odor is driven off, and it is consequently deprived of its qualities as a remedial agent, and for the use of the perfumer greatly deteriorated. A large quantity of musk collected by natives, which is invariably falsified, finds its way to this and other countries. They cut the young pods, containing no musk at all, as before mentioned, and fill them with the liver and blood of the animal, mixed with this yellow fluid and a small portion of genuine musk, fill, and sew them up in the skin, and dry on the hot stone; or those which yield half a drachm to a drachm they mix and dry in like manner.

At one of the Government sales in India of presents given by native princes, there were many pods of musk, to appearance very fine, which proved to be nearly worthless; they had evidently been "made up," and from long keeping the little real musk they contained had considerably evaporated.

It would be a difficult matter for a native to resist the temptation of not making some addition even to the finest pods, or of extracting a portion and filling it up with the mixture of blood and liver.

The interior of the Himalayas where the supply is obtained is towards Ladâk, Thibet, and Chinese Tartary, and, as these mountains extend over so many thousand miles, it is probable that the musks known as China, Nepaul, and other musks, and perhaps some Russian, are from the same districts. The Tartar tribes wander from place to place, bartering with the natives of these several countries who have access to these regions. Hence the musk would be from the same species, the difference in appearance being caused by its varying age and mode of preparing and drying.

The genuineness of musk depends on the honesty of the na-

tives and others who procure and dispose of it to the various markets.

The musk in the membranous bladder yields nearly double the quantity of grain musk to an equal weight of musk with the skin and hair.—*London Pharm. Journ.*, Feb., 1861.

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NOTE ON THE USE OF BALSAM OF PERU IN THE ROMAN CATHOLIC CHURCH.

BY DANIEL HANBURY, F. L. S.

In an interesting notice respecting the liquid commonly, though incorrectly, called *Balsam of Peru*, given some months ago in the *American Journal of Pharmacy*, the writer, Dr. Charles Dorat, pointed out the curious fact that the balsam was at one time in such great esteem, that its employment was sanctioned by high ecclesiastical authority in the preparation of the chrism used in the Roman Catholic Church. It appears, moreover, that there still exist among the archives of Guatemala, copies of bulls of Popes Pius IV. and V., authorizing the clergy to make use of this balsam in the Holy Chrism, and pronouncing it sacrilege to destroy or injure the trees producing it.

Thinking it would be interesting to ascertain with precision the terms of these ancient documents, I asked my friend, Signor Vincenzo Sanguinetti, Professor of Mineralogy at Rome, to make application in the proper quarter, and to obtain for me, if possible, copies of the bulls in question. Professor Sanguinetti was kind enough promptly to respond to my request, but he found that the records of bulls issued during the pontificate of Pius IV. have been lost, and that none can now be discovered in the archives of the Vatican. His search for the bull of Pius V. was, however, successful, and he forwarded me a copy, which, with a translation, I have given below. It will be observed that the bull allows the substitution of *Balsam of Peru* for *Mecca Balsam*, which latter, mixed with oil, constitutes the ordinary *Chrisma principale* of the Roman Catholic Church.\*

\* Vide Dr. Hook's *Church Dictionary*, Ed. 6, Lond., 1852, where *Chrism* is thus defined :

" *Chrism*—Oil consecrated in the Romish and Greek churches by the

*Translation.*

A Faculty granted to the Bishops of the Indies, for the preparation of the Holy Chrism with a certain liquor or juice in the place of Balsam.

Pius V., Pope, for the perpetual commemoration of this matter.

We are rendered most anxious to admit to the favor of a careful hearing, these prayers, worthy of attention, by which a necessity occurs in the preparation of sacred things, and how the same may be provided for.

1. Forasmuch as it hath lately been explained to us, that in those parts of the Indies where our prelates sojourn, there is not found, nor can be found, the Balsam trees or oil therefrom, necessary for the preparation of the Holy Chrism; but there is found a certain liquid or juice, of wonderfully fragrant odor and exceedingly efficacious for the cleansing of wounds, which liquid is commonly used instead of the true Balsam, for it produces all the effects which the Balsam brought from Alexandria is accounted to have produced.

2. Wherefore these same prelates of the parts of the Indies have caused us to be humbly supplicated, that under these premises we would, of our apostolic bounty, vouchsafe to provide some convenient remedy.

3. We, therefore, willing to provide against necessities of this kind, and moved by these prayers, do, of our apostolic authority, concede by the tenor of these presents, full license and permission, as well to the archbishops as to the bishops of those parts, and, for the time being, to those prelates who may in future sojourn in those parts, that they may, in the preparation of the Holy Chrism freely and lawfully use the said liquid or juice in the place of balsam. And by a further indulgence we decree

bishop, and use in baptism, confirmation, orders, and extreme unction. This chrism is consecrated with great ceremony upon Holy Thursday. There are two sorts of it; the one is a composition of oil and balsam, made use of in baptism, confirmation, and orders; the other is only plain oil consecrated by the bishop, and used for catechumens and extreme unction. Chrism has been discontinued in the Church of England since the Reformation."

Consult also Hoffmann, *Lexicon Universale*, Lugd. Bat., 1698 (in verbum)

that the same efficacy shall be attributed to the said Holy Chrism if prepared aright with the said juice, as if balsam were an ingredient in it.

4. Any previous constitutions or ordinances whatever, whether apostolic, or given forth by provincial and synodal councils, whether special or general, to the contrary notwithstanding.

Given at Rome, at St. Peter's, under the Fisherman's Ring, this 2d day of August, 1571, in the 6th year of our Pontificate.  
—*London Pharm. Journ. March, 1861.*

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### THE POLYSULPHIDES OF THE HEAVY METALS.

By HUGO SCHIFF.

Concerning the behaviour of the metallic salts to the alkaline polysulphides, the chemical literature contains but two statements, both by Berzelius, namely, the behaviour of lead and of copper salts to pentasulphide of potassium. The following are the results of experiments performed by the author; in all cases a dilute solution of the salt was poured into an excess of a diluted solution of commercial liver of sulphur or of yellow sulphide of ammonium. The precipitates are mostly thick and flocculent, and soon begin to decompose, by separating sulphur and rendering the clear liquid opalescent; the precipitate usually becomes darker.

Lead-salts yield a deep red precipitate; the oxide and carbonate assume, on agitation, the same color; the precipitate turns brownish and finally black.

Copper-salts yield, according to the concentration, a dirty yellow to light brown precipitate, which separates sulphur without changing the color materially, or becoming of a constant composition.

Silver-salts: light yellow, turning green, finally black.

Salts of the binoxide of mercury light yellow; of the protoxide, dirty yellow, both immediately becoming black.

Salts of nickel, cobalt and protoxide of iron: black.

Sesqui-salts of iron at first violet, instantly yellow, subsequently discolored, if the sulphide is added to the salt. On dropping sesquichloride of iron into the sulphide, a yellow pre-

cipitate appears, changing through green into blue, finally black ; the blue color lasts  $\frac{1}{2}$  to 1 hour.

Salts of chromic oxide : a yellow precipitate, separating sulphur and evolving sulphuretted hydrogen ; the precipitate then contains chromic oxide, but no sulphide.

Salts of protoxide of manganese : a yellow precipitate, gradually increasing in bulk, turning lighter and changing into the ordinary sulphide.

Bichloride of tin : yellow, liberating sulphur, but not altering the color.

Protochloride of tin : liver-brown, slowly becoming lighter.

Chloride of gold and of platinum : yellow, soon discolored, dissolving in boiling liver of sulphur, and reprecipitated yellow by acids.

Basic nitrate of bismuth : dark yellow, gradually brownish black.

Salts of antimony : bright yellow, soluble in excess, reprecipitated as the orange colored pentasulphide by acids ; the original precipitate gradually changes into this with separation of sulphur.

Neutral compounds of arsenious and arsenic acid : yellow, containing free sulphur, soluble in slight excess.

Zinc-salts : white or very pale yellowish ; after drying, straw-yellow, without separating sulphur ; composition of the anhydrous =  $Zn S_5$ .

Cadmium-salts : light yellow, not decomposed, consisting of  $Cd S_5$ . The color of the dry precipitate is nearly the same as the protosulphide ; the moist precipitates are different.—*Ann. d. Chem. u. Ph.*, xxxix., 68—75.

J. M. M.

#### CITRATE OF IRON AND QUINIA.

BY WILLIAM S. THOMPSON.

Read before the Maryland College of Pharmacy, Feb. 14th, 1861.

This preparation, though not officinal in the U. S. Pharmacopœia of 1850, has acquired considerable favor among physicians as a remedy in which the properties of both iron and quinia are

combined, without possessing the ferruginous taste of many other preparations of iron. Several formulas for its preparation have been published, none of which seem to have accomplished the desirable result of affording a preparation easy of solution.

An investigation of this preparation having been one of the questions proposed by the committee for the selection of subjects for examination, some time since, it was accepted by me; and I now offer the accompanying formula, as the result of a number of experiments, performed at intervals of leisure.

I first prepare a solution of persulphate of iron of definite strength, according to the process recommended by Wittstein; or that of the U. S. P. for preparing the hydrated sesquioxide; the strength of the solution to be ascertained by assaying a portion; but to save this trouble, I prepare a solution, each fluid ounce of which will yield sixty grains of anhydrous sesquioxide, by the following formula:

*Solution of Persulphate of Iron.*

Take of Protosulphate of iron, in crystals, 16 ounces, troy.

Sulphuric acid, commercial, . . . . .	3	"	"
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Nitric acid, commercial, . . . . .	4	"	"
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Water, a sufficient quantity.			
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Place the protosulphate of iron in an open dish of the capacity of at least eight pints and add 24 fluid ounces of water and the sulphuric acid. Place the dish upon a sand-bath, over a furnace or other convenient source of heat, and after the protosulphate is dissolved and the solution has attained the boiling point, or nearly so, add the nitric acid in small portions from time to time, allowing a sufficient interval of time to elapse between each addition of acid to avoid violent effervescence. These directions are essentially the same as the U. S. P., but it is better to complete the process by the following directions of Wittstein: "A drop is taken out on the end of a glass rod and mixed with a drop of solution of ferridecyanide of potassium; if this causes only a brown coloration, the oxidation of the iron is perfect, but if there be a trace of blue, more nitric acid is necessary." The solution is now reduced by the addition of water to the measure of 36 $\frac{1}{2}$  fluid ounces, which is a little less than the

quantity afforded by calculation, and allows for any trifling loss.

The solution should be kept in a covered bottle, or the bottle should be kept secluded from the light, as this imponderable agent seems, like organic matter, to possess the power of reducing the persalts of iron, and thus the solution may become contaminated with protosulphate.

A solution of persulphate of iron of known strength is very useful to the Pharmaceutist as a source of peroxide in making a number of preparations, and is also convenient for the hasty preparation of this re-agent when wanted as an antidote for arsenious acid.

The next step in the process is to prepare a solution of ammonio-citrate of iron, containing an excess of citric acid, which is done as follows :

*Ammonio-Citrate of Iron.*

Take of Solution of persulphate of iron, 35 fluid ounces.

Water of ammonia, sp. gr. 0.925 a sufficient quantity.

Citric acid, 14½ ounces, troy.

Water, a sufficient quantity.

Dilute the solution of persulphate of iron with the water in a glass jar or bottle of proper size, pour in-fifteen fluid ounces of the water of ammonia, and stir the mixture until the re-action has taken place ; allow it to settle, and if on testing the clear solution it is found to contain no iron, wash the precipitate in the usual manner, until the washings are tasteless. Should the supernatent liquid contain iron, more ammonia is necessary, before proceeding with the washing. The precipitate is now to be transferred to a muslin filter and allowed to drain until it assumes the form of a magma, when it should be placed in a dish with the citric acid, and the mixture heated by means of a water-bath until the peroxide is perfectly dissolved ; then add six fluid ounces of the water of ammonia, remove the dish from the water-bath and allow the solution to cool.

Having now obtained a clear solution of ammonio-percitrate of iron, containing an excess of citric acid, the next step is to introduce the quinia, for which purpose carbonate of quinia is prepared as follows :

*Carbonate of Quinia.*

Take of Sulphate of quinia,  $3\frac{1}{2}$  ounces, troy.

Carbonate of soda, a sufficient quantity.

Water, a sufficient quantity.

Diluted sulphuric acid,  $4\frac{1}{4}$  fluid ounces.

Dissolve the sulphate of quinia in five pints of water, with the aid of the diluted sulphuric acid. Dissolve twenty ounces of carbonate of soda in five pints of water and add as much of the solution to the solution of sulphate of quinia, as may be necessary to precipitate the whole of the quinia; a considerable excess of carbonate of soda is not objectionable. Transfer the precipitated carbonate of quinia to a muslin filter and allow it to drain so as to free it as much as possible from sulphate and the excess of carbonate of soda; the remainder may be removed by displacement with a small quantity of water, so as to avoid any loss of the carbonate of quinia, which seems to be slightly soluble after it is freed from sulphate and carbonate of soda.

*Ammonio-Citrate of Iron and Quinia.*

Upon adding the washed magma of carbonate of quinia to the previously prepared and cooled solution of ammonio per-citrate of iron, it dissolves readily, with effervescence. The solution should now be filtered and evaporated in a water-bath to about the consistence of thin syrup, and spread thinly and evenly on plates of glass to dry. The concluding part of the process requires some management to produce an elegant result: it should be performed in a warm and dry atmosphere at a temperature of from  $70^{\circ}$  to  $80^{\circ}$  F. If the salt is allowed to dry on the plate of glass at the temperature of the room until the whole surface has separated into small fissures, and then suspended over a furnace or stove, at some distance above it,—say at the temperature of  $90^{\circ}$  F.,—it immediately loosens from the plate in the form of brilliant scales, and may be removed without difficulty with a palet knife or a plane iron.

Ammonio-citrate of iron and quinia cannot be regarded as a chemical compound of definite proportions, but merely as a mixture of the citrates of iron, quinia and ammonia: its component parts may be stated as follows, in 100 parts:

Peroxide of iron, anhydrous,	20.48
Citric acid, anhydrous,	53.81
Ammonia,	5.17
Quinia,	12.17
Water,	8.87
	—
	100.00

It may be proper to remark here, that water of ammonia of the sp. gr. 0.925 is about the strength of the Aqua Ammonia F. F. F. of the manufacturers, and contains 19.54 per cent. of ammonia. If weaker water of ammonia is used, of course it will require an increased quantity to furnish the same amount of ammonia as that of the sp. gr. 0.925, which may be determined by an easy calculation.

I have heard objection made to the introduction of ammonia into this preparation, but upon what reasonable ground I am at a loss to conceive: a small quantity of citrate of ammonia can certainly do no harm, and if it serves to render the compound soluble, this would certainly seem to be a desideratum.

The substitution of potassa for ammonia will also produce a soluble preparation, and soda would no doubt have the same effect; but the latter I have not tried: the potassium-citrate of iron and quinia is in very brilliant scales of light brown color and very soluble.

The proportion of citrate of quinia in this preparation is equal to about one-sixth part or one grain in six grains of the salt. The reasons for adopting this proportion, are, first,—it has been the custom in this country so to prepare it; secondly, Physicians are accustomed so to prescribe it; and thirdly, it is probable that a formula will be adopted in the forthcoming Pharmacopœia containing the same proportion.

Ammonio-citrate of iron and quinia is very soluble, of a beautiful olive green color, decidedly bitter, possesses but little or no chalybeate taste and has an acid reaction.—*Journ. and Trans. of the Maryland College of Pharmacy.*

## ON THE PREPARATION OF STARCH FROM CASSAVA,

BY JOSIAS CORK.

The growth of cassava in quantity has had my best, my most earnest consideration. If it cannot, in every sense of the word, compete with other staples, now, or which may be grown, my praise of the root must receive qualification.

First, then, cassava is alike at home in the mountains, and in the lowlands ; it grows readily everywhere. The least moisture in the soil is sufficient to induce vegetation at the time of planting, and, once growing, no drought destroys, it simply for the time retards the crop.

But, if general experience does not fully corroborate this positive statement,—and there are lands of so dry a nature that a long drought does kill the cassava plant, and I will not say there may not be such lands anywhere, as I can only decisively speak of what I have noted in my own experience,—still this evil, if it anywhere exists, is less in the cassava than in any other crop I know.

For, secondly, the propagation, and, therefore, also, the supply of a field partially injured by a drought, is about the easiest thing a planter has to do. To grow corn, pulse, yams, and many other things, a portion of valuable produce must be used for seed. Not so the cassava. All that is needed is, to take a cassava stick, and mark off a length containing three or four “eyes ;” pass a knife round and cut just below the skin, and then use a slight breaking power with both hands. Each bit is now a future plant ; the eye or two below the soil serve for future roots ; the eye or eyes above put forth leaves and stalks. It must be evident, then, that a bundle of cassava sticks, which any one can carry under his arm, will suffice for a considerable breadth of prepared ground, and the time and labor to cut up and plant is almost the least possible to be conceived for such operations, and the cost is positively nothing. Anybody, anywhere, who has cassava growing, can give readily a few cassava sticks to any body and everybody, and yet have enough left for himself, and to spare.

Thirdly.—Another fine feature is this :—It is not an exhausting crop. Like other productions grown for a substance which

appears to derive its constituents from the atmosphere, or composed, like sugar, of carbon, hydrogen, and oxygen; you may grow and re-grow, with change, of course, or some rest, or a slight manuring, on the same lands, *ad infinitum*. In fact, everybody feels that land is always fit for cassava, however unfit it may have become for other productions.

Fourthly.—This is a very accommodating crop. The roots ripen and are fit to be manufactured, or remain and grow, and again ripen, and again remain and grow. Although there is not a positive certainty as to the exact time, for the changes from rain to dry weather are uncertain, still there is a choice of a whole year or more for the grower. If the roots be not dug when they become dry and mealy, they soon acquire what is termed a "fresh spring,"—that is, the roots become somewhat watery, and enlarge, and then ripen. This goes on from the age of about ten months to more than two years. I do not know from experience beyond twenty-four months, but it is evident to me that it is not the limit, or anything like it. All the while the roots have been enlarging, so that there has been, as far as I can judge, no loss from delay. I have known a field of cassava cut down to near the roots in a most ruthless way by a lazy fellow who desired a field of corn and would not prepare fresh land. I have seen the crop of corn, and the crop of cassava again, covering by vigorous stems and leaves the ground, and, after a while, the ripe crop of cassava. Of course, this system is the *acme* of laziness, and to be wholly condemned, but, nevertheless, the fact stands forth, as a proof of the extreme hardihood and wonderfully-accommodating nature of the cassava crop.

Fifthly.—Quantity, as I have proved, or sought to prove, is, as other root crops, very large. I need not, therefore, enlarge on this head, but pass on to manufacture.

There again the cassava says, "Try me—try me: you will find me, in parts, and in whole, a crop worth your best care and attention." On this head I observe,—

First.—Each root has to be washed, and the cuticle must be taken off. The plain surface of the root makes the washing easy; the soft nature of the substance renders the skinning process as easy as easy can be. The comparison in favor of cassava, as against arrowroot, is in both cases fully as three to one in favor of cassava.

Secondly.—The grating is also in favor of cassava, as compared to arrowroot, in almost an equal rate. But,

Thirdly.—I would not grate at all ; but quote from pages of a known scientific work, and I suppose the site of operations to be the old works of a thrown up sugar estate, and unfortunately many such a spot can too readily be found. The manufacture is arrowroot, but of course the same works would equally do for cassava, and I may just observe that the manufacture is in the Island of St. Vincent, and I have no doubt its completeness is the cause of the superior price obtained for the St. Vincent arrowroot, which is just threefold the price of Jamaica arrowroot, in the English market :

“ The skinned roots are thrown into a large cistern, with a perforated bottom, and then exposed to the action of a copious cascade of water. The cleansed roots are next put into the hopper of the mill, and are subjected to the powerful pressure of two pairs of polished rollers of hard brass, the lower pair of rollers being set much closer than the upper. The starchy matter is thus ground into a pulp which falls into the receiver placed beneath, and is thence transferred to large and fixed copper cylinders, tinned inside, and perforated at the bottom with numerous minute orifices, like a kitchen drainer. Within these cylinders, wooden paddles are made to revolve with great velocity, by the power of a waterwheel, at the same time that a stream of pure water is admitted from above. The paddle arms beat out the fecula from the fibres and parenchyma of the pulp, and discharge it in the form of a milk through the perforated bottom of the cylinder. This starchy matter runs along pipes, and then through strainers into large reservoirs, where after fecula has subsided, the supernatant water is drawn off. The drying-house on the Hopewell estate is constructed like the hot-house of an English garden; but instead of plants it contains four dozen of drying-pans made of copper, seven and a half feet by four and a-half, and tinned inside. Each pan is supported on a carriage, and they run on rails; immediately after sunrise these carriages, with their pans covered with white gauze to exclude dust and insects, are run out into the open air, but if rain be apprehended they are run back under the glazed roof. In about four days the fecula is thoroughly dry and ready to be packed.”

What is done in St. Vincent may be done in Jamaica. The trash-houses of the past could easily be converted into drying houses for the future on any old sugar estate having a supply of water. The water which might easily be made to turn a cassava mill with two pairs of rollers, the boiling, curing, and still houses might all be transformed and brought into use for cassava ; and with the ingenious contrivance of our Island architect, Mr. Leahy, of having blades of glass, the drying-house might be thoroughly ventilated. I would not only have a glass roof, but for the most part glass walls, thorough ventilation, and thus lessen the time to the minimum for thorough drying.

The cost, then, of transformation would be very moderate indeed. The metal of the sugar boilers and still would pay, or nearly pay, for the vessels required for the cassava.

There is no duty on glass manufacture, and large slabs of thick glass cost little in England. The cost of manufacture of starch and blocking the fibre, would certainly be less than the cost of sugar manufacture.

To any one, then, who will turn his attention to cassava, he would certainly have a prospect before him of making an old sugar estate a handsomely paying concern as a cassava plantation.—*Chem. News, London, from Jamaica Guardian.*

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#### PROXIMATE ANALYSIS OF PLANTS, ETC.

(Continued from page 184.)

#### FURTHER INVESTIGATION OF THE SEVEN DIFFERENT SOLUTIONS, AND THE DISTILLATE OBTAINED FROM THE AQUEOUS DECOCTION.

##### SECTION I.—*Examination of the aqueous decoction and the distillate therewith obtained.*

###### A.—*Examination of the distillate.*

The watery distillate, which is obtained by the decoction of the material with water according to the previous directions, is either a clear or a turbid fluid. It has either a film of oil floating on the surface, or precipitated at the bottom, or not. If the distillate is a clear fluid, it contains either only a very little quantity of substances sparingly soluble in water, or none of these substances. If the water is turbid from the separated oil globules or, solid particles, it contains little of substances difficultly soluble in water or much of readily soluble ones. The water at first, when a layer of oil has collected at the top or bottom, mechanically separated from the oil.

After the principal bulk of the water has been removed by a syphon, its complete removal is effected by means of a separatory funnel or a pipette. The water is then treated precisely as when no layer has been separated on the surface or at the bottom. This method of treatment is described at length further on.

*a.—Examination of the separated oil.*

It is first ascertained whether the separated oil reacts on litmus paper or not. If the blue litmus paper is reddened thereby, the oil is either a volatile acid or a mixture of several volatile acids, or lastly a mixture of one or several volatile acids with other volatile bodies. It is scarcely necessary to remark that, besides the peculiar volatile acids, some aldehydes also may be present; for example, salicylous acid as well as the acid ethers of bibasic acids—as, for instance, the acid salicylate of methyloxide, which is obtained by the distillation of *Gaultheria procumbens*, and which behave in this and other respects as volatile acids.

If the oil has an acid reaction, the oil is introduced into a flask, and baryta water added thereto with agitation. This addition is continued until it has no longer an acid reaction; afterwards it is allowed to precipitate quietly. Either the oil has quite disappeared by this treatment with baryta water—if so it was a volatile acid, or a mixture of several such acids, or an acid aldehyde resembling the salicylous acid, or an acid ether, possibly a mixture of several aldehydes or ethers, or a mixture of several members of these two classes of bodies, or of all three.

The oil which remains, after the treatment with baryta water, is neutral or alkaline. In the latter case it is treated with dilute sulphuric acid. When a volatile base is present therein, it dissolves in the dilute sulphuric acid. If absent, as much oil is dissolved as would be dissolved in an equal quantity of pure water. If the first separated oil has exhibited an alkaline reaction instead of an acid one, it is at once treated with dilute sulphuric acid. Either a complete solution of the oil takes place, in this case an organic volatile base, or a mixture of several such bases is present, or a partial solution is effected when it is a mixture of one or more volatile bases with non-basic bodies.

As we learn by these experiments whether bases or acids are at the same time present, or bodies which behave as acids towards bases, and in case such bodies were found they have been removed by the treatment with sulphuric acid and baryta water, we now proceed to detect the presence of the aldehydes. If neither an acid nor a base is present, the oil can at once be used for testing for aldehydes. With this object, a portion of the oil is mixed with a solution of the bisulphite of potash as concentrated as possible. When an aldehyde is present, it is generally taken up by the solution of bisulphite of potash. Either a portion of the oil, or the whole of it, is dissolved, depending on the presence of indifferent bodies, besides one or more aldehydes. It should be observed, by the solution,

when it takes place, whether a more or less elevation of temperature results, caused by heat becoming free, in consequence of the combination of the aldehyde or aldehydes with the bisulphite of potash. When no reaction is produced at ordinary temperatures, this may be promoted by heat. Sometimes after the solution of the oil, or a portion of it, in the concentrated aqueous solution of the bisulphite of potash, by long standing and cooling, a separation of crystals results. If no such separation is observed, the undissolved portion of the oil can be removed mechanically, and alcohol carefully added to the solution, by which the separation of the aldehydes, or aldehyde in combination with the bisulphite of potash, is facilitated. Sometimes the addition of bisulphite of potash quite or partly congeals the oil, in consequence of the formation of a compound of the aldehyde with bisulphite of potash. In this case the solid or semi-solid mass should be washed with alcohol, and the washed product pressed between bibulous paper. If neither before nor after the addition of alcohol a solid compound of one or more aldehydes with bisulphite of potash results, the action of the corresponding soda-salt is tried, and when this affords no solid product, the corresponding ammoniacal bisulphite should be employed. If an aldehyde, or several of them together, are present, we obtain with the bisulphites of potash, soda, or ammonia, a compound or a mixture of them, from which, by the addition of dilute sulphuric or hydrochloric acid, or a solution of caustic potash or soda, the aldehyde or aldehydes can be again separated.

In the same way here described, the oil, freed from acids by baryta water, and from bases by dilute sulphuric acid, is treated to remove the aldehyde or aldehydes present.\* If, after the separation of the bases and acids or aldehydes present, any oil remains, this portion may either be a hydrocarbon or a mixture of several such bodies, or an oxygenated indifferent oil, or a neutral compound ether, or a mixture of several of these bodies.

To ascertain whether we have to do with a *hydrocarbon or a mixture of several hydrocarbons*, or whether *an oxygenated volatile substance* is also present, a fragment of sodium or potassium is introduced into the oil, previously dried by means of chloride of calcium. If the metallic fragment remains unacted upon in the fluid even after the application of a gentle heat, no oxygenated body exists in the oil; consequently the oil must be

\* I found, by the examination of oil of origanum, that it consisted of two volatile oils, which afforded, when heated with an aqueous solution of bisulphite of soda or ammonia, a solid body, but which contained no sulphur, soda, or ammonia. I have deemed it necessary to call attention to this circumstance, as it is highly probable that there are many other volatile oils which behave like oil of origanum. Consequently, if we would decide with certainty on the presence of an aldehyde, we must ascertain whether the product obtained by the action all alkaline bisulphites contains sulphurous acid, or the alkali employed in its preparation. If sulphurous acid and a'kali cannot be detected, no aldehyde is present.

a hydrocarbon, or a mixture of several hydrocarbons. On the contrary, if that oil reacts on the potassium or sodium, an oxygenated body, or a mixture of several such bodies, is present.

To prove whether or not the oxygenated body present is *a compound ether*, the oil under examination is divided into two parts. One portion is treated with caustic ammonia in a small flask, by which, in many cases, an amide of the acid of the ether separates, while the alcohol corresponding to the ether becomes free. The second portion of the oil is introduced with baryta water into a small retort, a little of the crystals of hydrate of baryta thrown in, and the retort so connected with a small Liebig's refrigeratory apparatus that the condensed vapors are compelled to flow back again into the retort, when the contents of the retort are heated to the boiling point. When the ebullition has been continued for some time, the refrigeratory apparatus is brought into its ordinary position, and the distillation proceeded with. The hydrocarbons present, as well as the indifferent oxygenated oils, pass over with the aqueous vapor; likewise the alcohols derived from the ethers. The acids of the ethers remain behind, combined with the baryta. The residue of the retort is, when cold, removed, and the baryta separated from the liquid, which, when necessary, should previously be filtered, by means of dilute sulphuric acid. After separating the sulphate of baryta by a filter, the liquid is again distilled, whereby the acid contained either in the distillate in which its presence may be easily detected, or when it is not distillable with water, its concentrated solution remains behind in the retort. From this fluid the acid, under proper conditions, may be crystallized out. The existence of compound ethers in the oil, separated from the distillate, is not very frequent, as the majority of ethers, being readily soluble in water, are found dissolved in the aqueous distillate.

If no compound ether is present, it is still to be determined whether an oxygenated indifferent volatile oil is admixed with hydrocarbons or not, which was partly discoverable from the treatment of the oil with potassium or sodium. To detect such body, the oil to be examined is introduced into a small retort, which is half filled with coarsely powdered soda-lime.\* The oil is absorbed by the soda-lime. After a flask, as a receiver, has been adjusted, the retort is carefully heated. The hydrocarbons will be distilled over, unchanged in their composition, while the oxygenated oils will be decomposed by the action of the alkaline compound. Generally, non-volatile compounds result therefrom, which only are decomposed by higher temperatures, under the formation of volatile compounds. Gerhardt and Cahours, in this way, have separated the hydrocarbons from

\* Soda-lime is made by mixing lime with a solution of caustic soda, in such proportion that, upon evaporation, the mixture, when heated to redness, shall be equivalent to one part of the hydrate of soda, with two parts of anhydrous lime.—*EDITOR PHARM. JOUR.*

the oxygenated oils, in many mixed oils. Frequently the oxygenated oils afford, by this treatment, colored decomposition products. Thus the distillate of the oil of calamus over soda-lime is at first colorless, so long as the lighter volatile oils distil over unaltered. Later, a blue distillate appears, arising from the decomposition of the less volatile oxygenated portion of the oil of calamus, by the alkali at a higher temperature.

We turn back to the aqueous solution of the baryta salt or salts, which was obtained by agitating the oil with baryta water, which oil had collected on the surface, or at the bottom of the watery distillate. The solution is divided into two parts. The first is introduced into a retort, into which a little hydrate of baryta is placed. The retort is connected with a refrigerator, and the greater part of the water is distilled off. If an acid ether was present, this is decomposed. The corresponding alcohol is separated, and is found in the distillate, and the acid in combination with the baryta is in the residue of the distillation. The second part of the solution is mixed with dilute sulphuric acid, as long as a precipitate of sulphate of baryta is formed. The sulphate of baryta is separated by filtration, and the filtrate distilled off until a small residue remains. As the fluid must contain a tolerably large quantity of volatile acid compounds, it may be ascertained whether an aldehyde of an acid character is present or not, by the addition of a highly concentrated solution of alkaline bisulphites, and a sufficiently large quantity of anhydrous alcohol. If this is not the case, then only a volatile acid, or a mixture of several such acids, is present.

It was previously mentioned that the oil separated from the distillate, when before or after treatment with baryta it reacted alkaline, should be shaken with dilute sulphuric acid that the base or bases present may be obtained dissolved as sulphates. The solution of sulphates is then mixed with baryta water as long as a precipitate of sulphate of baryta ensues; for certainty, one or two drops of baryta water is added in excess, and the liquid distilled from a retort which is connected with a refrigeratory apparatus, as long as the distillate has an alkaline reaction. The distillate is now exactly neutralized with dilute sulphuric acid and evaporated to dryness. The residue is treated with alcohol, which dissolves the sulphates of the bases. If a residue remains, either ammonia or methylamine is present, or a mixture of both, in the form of sulphates. After the expulsion of the alcohol from the alcoholic extract in the water-bath, the salts of the other bases perchance present remain behind. They may be easily obtained therefrom, by distillation with a solution of caustic potash, in an isolated form, or by mixing the salts with a solution of caustic potash and agitating with ether, by which an ethereal solution of the bases is obtained, from which the ether can be distilled off. If by the examination of the separated oil no bases, acids, or aldehydes have been found; if no compound ethers are present, or if these bodies have been removed; further, if the oxygenated indifferent volatile oils sometimes present have been separated from the hydrocarbons by distillation over soda-lime, in so far as

it is possible, by this method, we have still to ascertain whether only a hydro-carbon, or a mixture of several hydrocarbons, is present. To arrive at a conclusion on this point, the oil in question is distilled in a small retort in which a thermometer is inserted. A rapid continued rising of the boiling point proves that the oil is a mixture of several volatile substances.

It should be always observed whether a portion of the original oil, as it floats on the watery distillate, or falls to the bottom of the same as a layer, cannot be congealed by exposure to very low temperatures, independently of its reactions and other properties. Frequently a partial separation, simply by exposure to cold, may be effected in substances of that kind, more readily in this than in any other way.

In winter, the most convenient method is to stick a test tube containing the oil in a beaker glass filled with snow, and to stand the whole in a wooden vessel. The space between the glass and the wood vessel is filled with sawdust; the glass should stand on a layer of sawdust several inches high; into the glass, alcohol is poured carefully, when the snow melts, and the mixture cools down to 13° Fahr. below zero. The whole is covered with a quire of filtering paper. As paper and sawdust are bad conductors of heat, the depressed temperature continues sufficiently long to congeal the oil or to cause the separation of solid substances from it when this can be accomplished by cold.

Besides the volatile bodies just under consideration, which in the form of oils can be separated on the surface or at the bottom of the distillate, there exists still a class of bodies which in their composition are readily distinguished from those spoken of. These are the *essential oils containing sulphur*, as they are generally termed; for example, oil of mustard, oil of onion, oil of assafetida, oil of garlic, &c. The presence of these oils is generally rendered evident by their odor. But to be certain as regards their absence or presence, a portion of the oil is oxidized with nitric acid, and then tested for sulphuric acid. If sulphur is contained in the oil, it is converted into sulphuric acid by treatment with nitric acid, which can be detected by nitrate of baryta. The majority of these oils affords precipitates when dissolved in alcohol and mixed with a solution of bichloride of platina or bichloride of mercury. By the application of platina of bichloride the precipitates are either pure red, reddish-yellow, brownish yellow or reddish brown; and by the use of bichloride of mercury, on the contrary, white, sometimes with a shade of yellow.

It still remains to be stated how the alcoholic solutions of ethereal oils must be treated, as obtained when an oil is treated with alkaline bisulphites, and thereby partly congealed, and the fluid portion remaining removed from the solid compound by washing with alcohol.

Such a spirituous solution is shaken with milk of lime, and in a closed vessel allowed to remain undisturbed until the insoluble portion is deposited at the bottom. The clear fluid is taken off and distilled, to the distillate is added a piece of anhydrous, but not fused, chloride of calcium, after

it has been placed in a stopped bottle surrounded with cold water. The chloride of calcium dissolves in the alcohol and water present, and the volatile oil which was dissolved separates on the saline solution as a slight film, which can be removed by a pipette, washed with a little water, and obtained pure by rectification with water. As a strong bumping is unavoidable by boiling with a little water in the retort, I employ for this purpose a flask, and introduce with the water and the ethereal oil some large pieces of clean linen. This plan also prevents the spitting over in rapid distillation.

*b.—Examination of the watery distillate.*

If the watery distillate has a layer of oil on the surface or at the bottom which has been examined in the manner described, this distillate is a concentrated watery solution of the bodies contained in the layer of oil. The method of investigation, when the bodies are known, can be previously determined with exactness. As the bulk of these volatile substances which are readily soluble in water, must be contained in the distillate, a sufficient quantity of these bodies can be obtained from this watery solution when only a little was present in the separated oil. The *volatile acids*, in particular, which almost all are, tolerably soluble in water, can be obtained in large quantity from this fluid; likewise the *volatile bases*, when present. To obtain the volatile bases therefrom, the distillate is mixed with a few drops of sulphuric acid, and subjected to distillation. The bases remain as sulphates dissolved in the residue of the distillation. To separate the acids, they must be combined with a base, and the liquid removed by distillation. Although potash or soda, as the strongest bases, have the preference before all other bases, as by boiling they do not permit the volatile acids to become free, with which they have been once combined, their employment is still limited, when besides the volatile acids, other volatile substances exist in the distillate which by alkalies undergo a change in the heat if a small excess of such alkalies is present, or when they are rapidly decomposed by the oxygen of the air when in contact with alkalies. If soda or potash is employed, care must therefore be taken that no excess of alkali is present, but rather that a small quantity of free acid remains, which then clearly will not be retained, but be distilled off with the water and the other volatile bodies. The potash or soda can be replaced, often with advantage, by freely precipitated carbonate of copper, or the hydrated oxide of copper, by magnesia as well as by white lead, which has been specially prepared by passing carbonic acid through subacetate of lead, and should be applied in a fresh, moist condition, particularly when compound ethers are contained in the solution. When the distillate has deposited no layer of oil, but is clear or only slightly turbid, recourse must be had, as already mentioned, to *cohabitation*. But as with cohabitation a tedious heating of the fluid with the substance under examination is unavoidable, and the possibility of forming decomposition products is thereby

afforded, I prefer the direct concentration of a distillate, which contains little volatile ingredients, to cohabitation. The concentration is accomplished in the following manner:—The distillate poor in volatile substances is mixed with so much dry common salt as it will dissolve, and the resulting fluid is subjected to distillation. Generally, after half the water has distilled off, only pure water passes over. The distillation is then interrupted, the distillate is again saturated with common salt, and re-distilled. By the repetition of the distillation as often as it appears requisite, a concentration can be effected which affords a highly concentrated solution of the substances under examination soluble in water, and accomplishes a separation of the greatest part of the substances difficultly soluble in water. If the concentration is not accompanied by the separation of oily bodies by this treatment with common salt, then only bodies are present which are very soluble in water. To obtain these, two methods are proposed; either the fluid is saturated with common salt and agitated with ether, which, when it separates, is removed, and may be evaporated, or the distillate is treated with chloride of calcium. When ethereal oils with high boiling points are present, the treatment with ether is to be preferred. The ether evaporates quickly when exposed in a dish to the air; and to prevent the evaporation of the volatile oil with it, care must be taken that the dish which contains the ethereal solution of the volatile oil is set in a place where a good current of air rapidly conducts away the ethereal vapor. On the contrary, when volatile oils with rather low boiling points are present, the treatment with chloride of calcium has the advantage. Into the fluid concentrated by distillation with common salt, chloride of calcium in fragments is thrown in until the fluid appears as thick as syrup; it is then subjected to distillation. The distillate is again treated with chloride of calcium, and re-distilled. By three or four repetitions of these operations either a separation of the dissolved substances ensues (sometimes only a partial one,) or the concentration has so far progressed that the substance can be freed from water by the addition of a large quantity of fused chloride of calcium, and distillation, and may be obtained as a distillate, which certainly will be the case when the body possesses a boiling point not much above 212° Fahr. It is clear that a concentration of this kind is quite as little necessary as cohabitation, when only acid or basic bodies are contained in the distillate.

Before I conclude the examination of the distillate, or rather the volatile bodies present in it, I must here make some observations on the so-called fractional distillation.

*Fractional distillation* is recommended for the separation of mixed volatile substances. As this operation is generally performed, it is certainly suitable for the preparation in a pure state of the least volatile bodies in a mixture of that kind, but is not adapted for obtaining the more volatile constituents, because at the temperature by which the mixture boils, many of the constituents are evaporated which do not boil at that temperature.

The vapors of the boiling constituents do not pass over alone, but also the vapors of the less volatile substances are carried over with them. Instead of heating the mixture to the boiling point, it is more advantageous to heat it near to the boiling point. *A slow evaporation* then takes place, which proceeds, indeed, rather slowly, but by adopting suitable precautions, the lighter volatile constituents of a mixture are to be obtained approximately pure, if not absolutely free from all admixture of the other bodies. To guard against the oxidation of substances which so long exposed to the air at elevated temperatures, have opportunities enough to combine with the oxygen, the distillatory apparatus as well as the receiver should be filled with carbonic acid gas during the evaporation.

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### Minutes of the Philadelphia College of Pharmacy.

A special meeting of the College was held on the 5th of 3d month, 1861. Present 20 members. The President in the Chair.

In explanation of the object of the meeting an extract from the minutes of the Board of Trustees was read, showing that in view of the recent change in the administration of the Government at Washington, the Board have prepared a memorial to be addressed to the Secretary of the Treasury in relation to the appointment of Special Examiner of Drugs at this port, and had called this meeting of the College with a view to its adoption.

A communication was also read covering the memorial on the same subject, addressed to the President of the United States, by the several medical and pharmaceutical organizations of New York. On motion the memorial prepared by our Board of Trustees was then twice read and unanimously adopted as follows:

To the Hon. Salmon P. Chase, Secretary of the Treasury U. S.

The memorial of the Philadelphia College of Pharmacy, an institution chartered in 1822 by the State of Pennsylvania, for promoting a knowledge of the science and art of Pharmacy, and for directing attention to the quality of articles brought into the drug market, respectfully represents, that owing to the ruinous effect upon the public health of the importation of spurious, adulterated and deteriorated drugs and medicines, a law was passed by Congress, approved on the 26th of June, 1848, providing for the examination of all articles imported for use in medicine, during their transit through the various custom houses, with a view to ascertain their purity and genuineness, and directing that when unfit for use such goods should be destroyed or reshipped.

This law has had a salutary effect upon the quality of imported drugs and medicines, notwithstanding the obvious difficulties in the way of its proper and efficient execution. The professional requirements of the office of Special Examiner under this law are peculiar, and can only be determined upon by those who are themselves familiar with the difficulties and complexities of the subject, and we would respectfully urge, that

they should be judged independent of all political considerations by the proper scientific representatives of the professions of medicine and pharmacy in the respective localities.

Your memorialists, therefore, with an exclusive view to the important public interests involved, respectfully ask that no appointment to the office of Special Examiner of drugs at this port be definitely concluded, without the official approval of this College, or some competent medical body selected for the purpose.

The President of the College is directed to sign this memorial, and to affix the seal, attested by the Secretary, and the Corresponding Secretary to forward it with an appropriate explanatory letter.

On motion, the Corresponding Secretary is instructed to furnish the President of the New York College of Pharmacy with a copy of this memorial. Then, on motion, adjourned. EDWARD PARRISH, *Secretary.*

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The fortieth annual meeting of the College was held at the hall, 3d mo. 25th, 1861. Present 27 members. The President in the Chair. The minutes of the last semi-annual and of the recent special meeting were read and approved.

The minutes of the Board of Trustees for the last six months were read by A. B. Taylor, Secretary of the Board. From these it appears that the instructions of the College in regard to the purchase of a microscope, and the requisite botanical works for the use of the Committee on Herbarium have been carried into effect.

The condition of the School of Pharmacy, as shown by the said minutes, has been highly prosperous during the past session; of the one hundred and twenty-five matriculants, 39 have taken the degree, which was conferred on them, and the graduates of the summer term, by the President, at the annual commencement on the 14th instant, as follows:

GRADUATING CLASS.	SUBJECT OF THESIS.
J. M. Abernethy,.....	New Jersey .....
George D. Blomer,.....	Pennsylvania .....
Frederick Brown, Jr.,.....	Pennsylvania .....
F. B. Carbonell,.....	Cuba .....
William P. Clothier,.....	Pennsylvania .....
Charles H. Cressler,.....	Chambersburg .....
Charles F. Dare,.....	Philadelphia .....
George H. Davis,.....	Philadelphia .....
William H. Evans,.....	Philadelphia .....
Robert Gibson,.....	Philadelphia .....
William H. Giffard,.....	Tuckerton .....
William H. H. Githens,.....	Pennsylvania .....
William D. Harrison,.....	London .....
George E. Hayes,.....	Athens .....
T. Jefferson Hedges,.....	Philadelphia .....
Emile Heydenreich,.....	Soultz-sous-bois .....
W. Ralph Higinbotham,.....	Bermuda .....
	{ <i>An investigation of the Resinoids.</i>
	<i>Nepeta Cataria.</i>
	{ <i>The comparative value of the commercial varieties of Aloes.</i>
	{ <i>The Honey Bee and the products it furnishes to Pharmacy.</i>
	<i>Euonymus Atropurpureus.</i>
	<i>Ergot of Zea Maize.</i>
	<i>Scoparius.</i>
	<i>Cimicifuga Racemosa.</i>
	<i>Aletis Farinosa.</i>
	<i>The Root of Gossypium Herbaceum.</i>
	<i>Powdered Extract of Hyoscyamus.</i>
	{ <i>Extemporaneous Pharmaceutical Preparations.</i>
	<i>Magnolia Glauca.</i>
	<i>Some Narcotic Extracts.</i>
	<i>Helianthemum Canadense.</i>
	<i>Phosphate of Sesquioxide of Iron.</i>
	<i>Frazera Walleri.</i>

GRADUATING CLASS.			SUBJECT OF THESIS.
Howard C. Kearney,.....	Philadelphia.....	Pennsylvania.....	<i>Geranium Maculatum and its Syrup.</i>
James Kemble,.....	Penningtonville.....	Pennsylvania.....	<i>Cucurbita Citrullus.</i>
Charles Letts,.....	Bordentown.....	New Jersey.....	<i>Radix Sumbul.</i>
John C. Long,.....	Lancaster.....	Pennsylvania.....	<i>Jalapa, Extracta aquosa et Resina.</i>
William E. F. Mason,.....	N. Bridgewater,.....	Massachusetts.....	<i>Urtica Dioica, Common Nettle Root.</i>
Brewer Mattocks,.....	St. Paul.....	Minnesota.....	<i>Asclepias Tuberosa.</i>
James Merray, Jr.,.....	Cape Island.....	New Jersey.....	<i>Buzus Suffruticosa.</i>
Decatur Milligan,.....	Lewisburg.....	Pennsylvania.....	<i>Aldris farinosa.</i>
Wilson H. Pile, Jr.,.....	Philadelphia.....	Pennsylvania.....	<i>Saccharum.</i>
Alfred J. Rankin,.....	Shippensburg.....	Pennsylvania.....	<i>Syrupus Rubi Villoso Compositus.</i>
Joseph Reel,.....	Philadelphia.....	Pennsylvania.....	<i>Polygala Senega.</i>
Elam Rhoads,.....	Norristown.....	Pennsylvania.....	<i>Asclepias Tuberosa.</i>
Clayton F. Richards,.....	Haddonfield,.....	New Jersey.....	<i>Stillingia Sylvatica.</i>
Nathaniel Richardson,.....	Philadelphia.....	Pennsylvania.....	{ Arsenic in connection with artificial manures.
Thomas K. Schellor,.....	Chambersburg.....	Pennsylvania.....	<i>Spiraea tomentosa.</i>
Richard B. Sheridan,.....	Philadelphia.....	Pennsylvania.....	<i>Unguentum Mitzerei.</i>
Robert J. Siddall,.....	Philadelphia.....	Pennsylvania.....	<i>Cimicifuga racemosa.</i>
Ephraim K. Smith,.....	Philadelphia.....	Pennsylvania.....	<i>Eryngium Aquaticum.</i>
J. Melancthon Stoever,.....	Mechanicsburg.....	Pennsylvania.....	<i>Calamina.</i>
Charles Tuller,.....	Philadelphia.....	Pennsylvania.....	<i>Indigo.</i>
Wm. Henry Weatherly,.....	Freehold.....	New Jersey.....	<i>Oleum Gossypii.</i>
Charles Woods,.....	Danville.....	Pennsylvania.....	<i>Polygonatum Uniflorum.</i>

The minutes of the Board further inform of the election of Theodore A. Keffer to membership in the College.

John Bringhurst and F. C. Hill tendered their resignations from membership. On motion these were accepted, on the usual conditions.

The proposal to adopt a new Law to be called Law X. as submitted at the last stated meeting, being now considered and discussed, a motion was made and adopted, to alter the number 5 to 3 in the new Standing Committee, and then on motion the new law was finally unanimously adopted, the titles of Law X. and Law XI. being changed to Law XI. and Law XII.

#### *Law X. of the Herbarium.*

"A Standing Committee of three shall be appointed by the College at its meeting in September to keep the Herbarium in order, to collect plants, to place them in condition to be used in lectures on Botany, Materia Medica, Pharmacy, &c., to effect exchanges, and enter into correspondence with individuals, Societies and Colleges of our own and foreign countries."

The following Report was read by the Corresponding Secretary.

The undersigned, Corresponding Secretary of the College, begs leave to report that since the last annual meeting he has had occasion to notice the following matters pertaining to his office :

The subject of exchanging botanical specimens with the Swiss Apothecaries' Association, as presented in the Minutes of the meeting in September last, has since then remained entirely in the hands of the special committee appointed on that subject, as the direction given to that committee to open Correspondance, etc., with Dr. Fluckiger has rendered any further action from the Corresponding Secretary superfluous.

In October last a package was received from Mr. Charles Murray of Buenos Ayres, South America, containing four numbers of a pharmaceu-

tical journal published under the auspices of "the Pharmaceutical Association of Buenos Ayres" in the Portuguese language, and accompanied by a communication from Mr. Murray on behalf of Senor Francisco Solano Burgos, the Secretary of the Association, tendering their Journal to the Philadelphia College of Pharmacy. The communication was duly acknowledged by mail, and as soon as a fit opportunity occurs, it is proposed to forward our Journal in exchange.

At a Special Meeting of the College, held the 5th instant, it was directed that the Corresponding Secretary should forward to the Secretary of the Treasury of the U. S. a copy of the memorial then adopted in relation to the appointment of Special Examiner of drugs at this port, accompanied by an explanatory letter, and also to forward a copy to the President of the New York College of Pharmacy. The last was immediately sent with the requisite explanation, and as soon as the certified copy of the memorial with the seal of the College attached was received, it was at once enclosed in an appropriate letter and forwarded by mail to Washington. It is only necessary further to state, that in the communication to Mr. Meakim, forwarded with a copy of the memorial, the undersigned took advantage of the opportunity to acknowledge the reception of the copy of the first memorial of the N. Y. College of Pharmacy, and of the several Medical Societies of New York, through Dr. E. R. Squibb, Chairman of a joint Committee.

All of which is respectfully submitted,

WILLIAM PROCTER, JR.

The Committee on Sinking Fund made a Report, showing that since the last annual meeting they have paid one thousand dollars on account of the bond and mortgage secured upon the College building, which leaves the whole debt of the College at this date only two thousand dollars. On motion the Report was accepted.

The Latin Label Committee presented a statement of their transactions for the past year, showing a balance in their hands of \$625.00; it was read and accepted.

The Publishing Committee reported that the American Journal of Pharmacy has been issued regularly since the last report. By an arrangement with our fellow member, John M. Maisch, each number is furnished with a condensed *résumé* of the prominent items of the German journals, for which we have heretofore had to look to the English and French Exchanges. The Editor takes this opportunity to acknowledge the numerous valuable original communications which have been received from the same gentleman. By an arrangement effected through the agency of Mr. Charles Jungnanns of Cincinnati, during a recent visit to Europe, some progress has been made in extending our German exchanges. By the annexed report of the Treasurer of the Committee, it was shown that the finances of the Journal have been influenced by the present disturbed state of the country, as would naturally be expected. The belief is expressed, however, that there will be no permanent injury to its circulation resulting from this cause, but that with the return of confidence in the business community the finances will improve.

On motion, the Report was accepted.

The following Report was read, and accepted:

The Committee on Botany respectfully report:—

During eight months of the past year, from April to November, we

have made 50 excursions, and collected about 400 species and varieties of phanerogamous plants, officinal or otherwise useful, either in medicine, the arts, or as ornamental plants.

Of these plants, we have remarked the following as growing wild: Papaver somniferum, P. Rhoeas, Brassica rapa, Raphanus sativus, Viola odorata, Althaea rosea, Matricaria parthenium, Cannabis sativa, Asparagus officinalis. All were found in the neighborhood of dwellings or farms, but with the exception of the last two, can scarcely be considered as sufficiently naturalized in this locality.\*

We have commenced to prepare the *Collectio Plantarum Officinarum* as authorized by the College in September last; until now we have mounted on suitable boards 84 different species and varieties of plants, mostly of our own collection, all of which either are, or have been, or are likely to become, officinal; some others require to be mounted yet. Along with the plants from our own soil, we have also mounted the corresponding foreign species, likewise sections of the root, the fruit and the seed. Herewith we present to the College two of the cases prepared for the reception of this collection.

The plants collected by ourselves, and the various smaller collections in possession of the College, we are now busily engaged to arrange into the principal herbarium, for the better keeping of which we had some of the book cases altered, after obtaining an appropriation from the Board of Trustees. We expect to finish this work in about two weeks, when we will be ready to prepare our exchanges for Europe.

In accordance with the authority granted to us, we have entered into correspondence with various pharmacists and botanists, both in the United States and Europe. Besides to Dr. Flückiger in Berne, we shall prepare a collection for Professor Theobald in Chur, and for Mr. Daniel Hanbury in London, who has consented to further our object by inducing some of his friends to exchange with us. On the European continent we are in hopes of having another correspondent through the influence of Professor Büchner in Munich.

The Committee feel indebted to Messrs C. A. Heinisch of Lancaster, Pa., F. Stearns of Detroit, Mich., Dr. Rob. Battey of Rome, Ga., and E. L. Massot of St. Louis, Mo., for the kindness and the zeal which they have manifested in securing us exchanges from their respective localities. Some of the gentlemen to whom we have been referred, have not yet directly expressed their inclination to exchange with us; but we believe that we shall enter upon our first year's exchanges with eight correspondents in this country and Europe.

It is obvious that your Committee will be kept very busy during the approaching season with collecting medicinal and other plants; most of those of our last year's collection will have to be gathered anew, to meet the probable demands; for a number we have to find new places of growth; and natural orders, which had to be more or less neglected last year, will receive more attention in consequence of greater facilities being offered after the expected arrival of the microscope. It shall likewise be our endeavor to complete as nearly as possible the officinal collection by next fall, so that it may be used in the lectures during the coming winter.

While the gathering of plants in the fields and forests of our neighborhood is connected with great pleasure, and, we hope, benefit to ourselves and the College, we wish to draw attention to a circumstance which

\* NOTE. The list of plants collected, with the locality where found, we have had to omit for want of space. Editor.]

when carefully and judiciously carried out, may result in much good to the whole country. Among the plants growing spontaneously upon our soil, there are many troublesome and frequently worthless weeds, quite a number of which have been imported from foreign countries, and now thrive luxuriantly, having become entirely naturalized. But few really valuable plants are naturalized in a few localities in the United States, and it has occurred to your Committee to make an attempt, not to cultivate such, but to try whether some of them at least could not be made to grow spontaneously on this continent. Among those which we have in view are *Aconitum napellus*, *Atropa belladonna*, *Hyoscyamus niger*, *Colchicum autumnale*, *Anthemis nobilis*, *Matricaria chamomilla*, *Digitalis purpurea*, &c. We invite the co-operation of all pharmaceutists in this, in our opinion, important project, and while we are ready to impart any information thereon, in our power, we should feel obliged for any aid extended to us.

With the number of pharmaceutists who graduate every year in Philadelphia, our College becomes connected by many ties with the various sections of the North American continent and the West Indian Islands. Undoubtedly it would be gratifying to the institution in which they completed their pharmaceutical education, if they would remain in scientific intercourse with it. A pleasant and ever gratifying field of their labor would be, amongst others, the culture of botany, and your Committee would gladly enter into exchanges with them. We now take pleasure to inform you that two former pupils of the College, Mr. Maurice W. Alexander, of St. Louis, Mo., and Mr. Geo. E. Hays, of Athens, Ga., have signified their willingness to assist us in the collection of a general herbarium, by supplying us with plants from their localities. It is our hope that others may follow.

Signed,

JNO. M. MAISCH,  
WILLIAM R. WARNER,  
of the Committee.

On motion of Robert England, a vote of thanks was unanimously tendered this Committee for their zealous and efficient labors. They were continued until the election of the Standing Committee on Herbarium, as provided by Law X.

On motion the College took a recess, for the purpose of electing Officers, Trustees and Committees.

Robert England and H. F. Geyer were appointed Tellers, whose Report was as follows:

*President.—CHARLES ELLIS.*

*1st Vice President.—Samuel F. Troth.*

*2d Vice President.—Dillwyn Parrish.*

*Treasurer.—Ambrose Smith.*

*Recording Secretary.—Edward Parrish.*

*Corresponding Secretary.—William Procter, Jr.*

*Eight members of the Board of Trustees.*

Dr. Robert Bridges,

T. S. Wiegand,

S. N. James,

J. T. Shinn,

J. C. Savery,

S. S. Bunting,

D. S. Jones,

T. M. Perot,

*Publishing Committee.*

W. Procter, Jr.,  
C. Ellis,

A. B. Taylor.

E. Parrish,  
J. M. Maisch,

S. F. Troth,

A. Smith.

E. Parrish.

*Delegates to the American Pharmaceutical Association.*

C. Ellis,  
E. Parrish,

W. Procter, Jr.,  
J. Clarkson Griffith.

On motion, the delegates were empowered to add an additional member to their number and to fill vacancies.

Then on motion the College adjourned.

EDWARD PARRISH, Secretary.

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## Editorial Department.

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THE NEXT MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—But four months are to elapse before the period set for the next meeting of the Association will arrive. It is very desirable that those who have accepted subjects for investigation, should be prepared to report on them, whether they are able to get to the meeting or not. In view of the disordered condition of public affairs, it is doubtful whether there will be a large attendance even from places adjacent to the place of meeting, and it is all the more important that the reports should go on, so that at least some interest may be obtained for the Proceedings of 1861. As a *scientific* body, national and even continental in its scope, the American Pharmaceutical Association should live on through all changes of a political character, and hence, whatever else be done, it is of vital importance that the regular preliminary forms for the meeting should be carried out, and that a meeting should occur, if but a dozen members be present. It will be for the President to issue his call in the July number of this and other Journals, and it is to be hoped that ere the period of convening, the dark clouds which now lower over our beloved country will be dispersed.

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DRUG EXAMINERS.—By reference to the Minutes of the College, at page 281, it will be seen that a memorial has been sent to the Secretary of the Treasury, urging the importance of more care in the appointment of these officers as regards their fitness for the duties of their office. It is hardly

probable that, under the present state of public affairs, much attention will be given to this matter, but the importance of the subject should not be lost sight of, when the proper period arrives.

**OUR SCHOOL OF PHARMACY.**—It is with pleasure that we refer to the list of graduates in Pharmacy, at page 282, which is the largest graduating class that has yet received the honors of our College. It will be seen on examination that the list includes a considerable number who are not Philadelphians. Some of these are from the South and West. It is encouraging to observe the increased interest that has been manifested of late years, in regard to a better education among pharmacists. Young men who have served three or four years in Maine, Georgia, Ohio and other States, or in Cuba, have come on and subjected themselves to the expense and inconvenience of a two winters' sojourn in our city, in attendance on lectures in order to get information and a diploma. Under these circumstances it is of the utmost importance that the accessories to pharmaceutical education be increased and perfected as far as possible. Among these accessories yet in the future, is a school of Practical Pharmacy, where young men can perfect themselves in manipulation of the higher grades. The expense attending a school of this kind, has heretofore, and probably will for some time, prevent its establishment as a part of the operations of our College of Pharmacy, but it must eventually become an important feature of the tuition extended.

**THE GREAT EXHIBITION AT LONDON IN 1862.**—Already the English Journals are calling attention to the fact, that it has been determined to hold another "World's Exhibition" at London, in 1862, and that Pharmacy should be represented there. It is doubtful whether, in the present condition of this country, much attention will be attracted from the inventors and manufacturers of the United States.

*A Colloquy on the Duties and Elements of a Physician.* By THOMAS S. POWELL, Professor of Obstetrics in Atlanta Medical College. Written at the request of his private class. Atlanta, Georgia, 1860. pp. 68. 18mo.

We acknowledge the reception of this little volume from the author. As its title asserts, it is intended to convey, in an agreeable and easy form, valuable information in regard to the ethical relations of the physician.

*O'Reilly on the Placenta, and the phenomena connected with the animal and organic nervous system.* By JOHN O'REILLY, M. D., New York, 1861, pp. 46. Octavo.

From the author.